VOLUME XXXVIII Established 1914 NUMBER 3

CHEMICAL INDUSTRIES

MARCH, 1936

Consulting Editors

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Published on the tenth day of each month at New Haven, Conn., and printed for the publishers by The Tuttle, Morehouse & Taylor Company.

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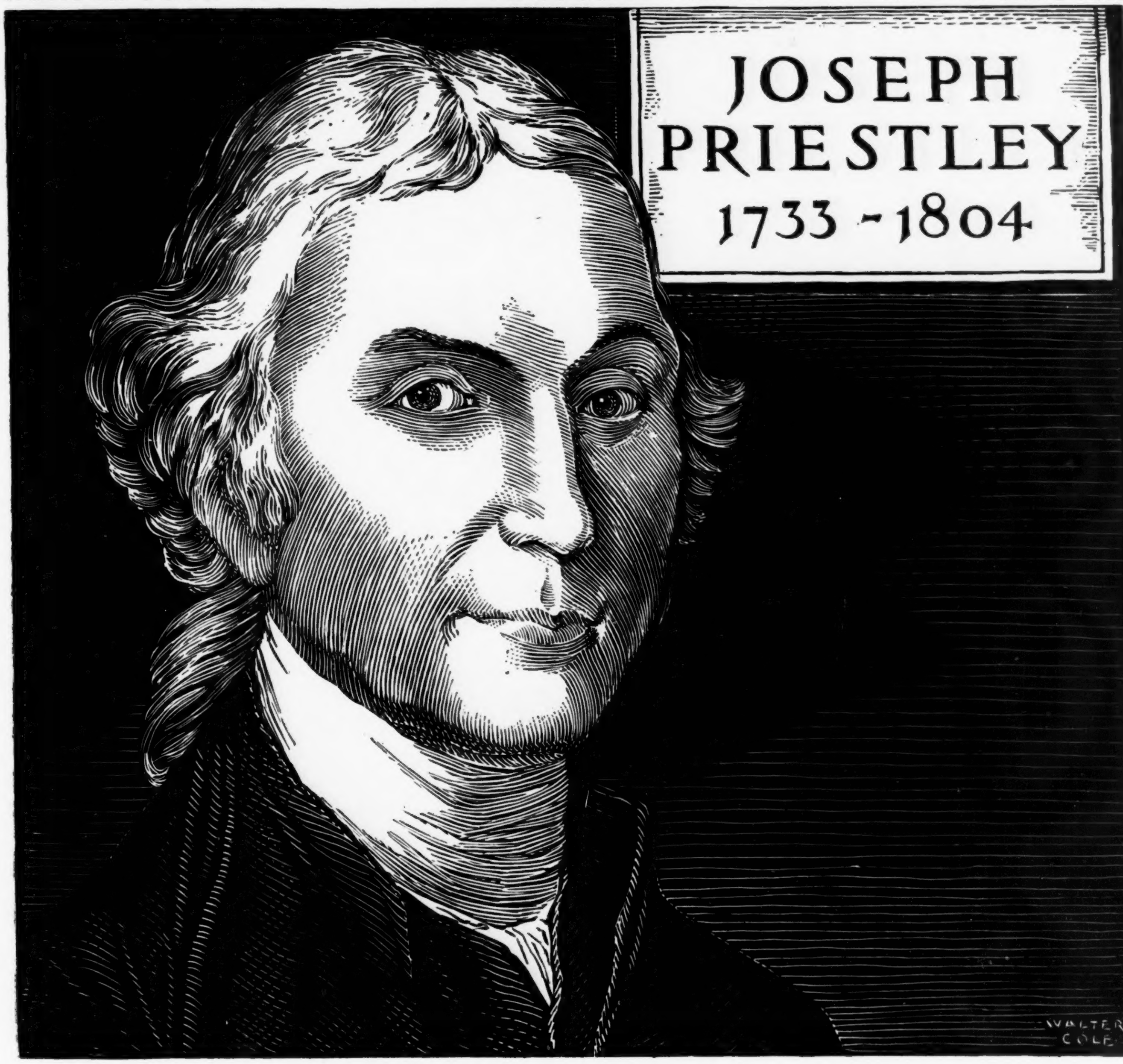
NUMBER FOUR OF A SERIES OF FAMOUS PIONEERS IN CHEMICAL HISTORY



TO JOSEPH PRIESTLEY, chemist-minister, belongs the distinction of discovering nine important gases, among which was ammonia. In the course of his experiments, Priestley established the fact that ammonia is composed of nitrogen and hydrogen gases. One hundred and fifty years later another pioneering venture in ammonia was launched at Niagara Falls when Mathieson started the operation of a synthetic ammonia plant which took nitrogen from the air and combined it with by-product hydrogen gas from the electrolytic alkali process. Produced by an organization already well-versed in the manufacture and handling of compressed gases, Mathieson Anhydrous Ammonia has from the beginning been noted for its purity and for the trouble-free container equipment in which it reaches the consumer.

The MATHIESON ALKALI WORKS (*Inc.*), 60 East 42nd St., New York, N.Y.

During an early experiment at his cottage near Leeds, England, Priestley is said to have driven his protesting family from the house with the pungent ammonia fumes he generated. Years later, political enemies incited a mob to burn down his house and laboratory near Birmingham. Priestley was barely able to save himself and his family. Soon after, he emigrated to America, where he died nine years later at the age of 71.

SODA ASH . . . CAUSTIC SODA . . . BICARBONATE OF SODA . . . LIQUID CHLORINE . . . BLEACHING POWDER . . . HTH AND HTH-15 . . .

Mathieson Chemicals

AMMONIA, ANHYDROUS AND AQUA . . . PH-PLUS (FUSED ALKALI) . . . SOLID CARBON DIOXIDE . . . CCH (INDUSTRIAL HYPOCHLORITE)

ADVERTISING PAGES REMOVED

The Reader Writes:—

Optimistic Hint

Genius is only the power of making continuous efforts. The line between failure and success is so fine that we scarcely know when we pass it—so fine that we are often on the line and do not know it. How many a man has thrown up his hands at a time when a little more effort, a little more patience, would have achieved success. As the tide goes clear out, so it comes clear in.

In business, sometimes, prospects may seem darkest when really they are on the turn. A little more persistence, a little more effort, and what seemed hopeless failure may turn to glorious success. There is no failure except in no longer trying. There is no defeat except from within, no really insurmountable barrier save our own inherent weakness of purpose.

New York City. L. A. PHILLIPS.

Back to the Fold

We are happy to answer your letter as we are among those of your very old subscribers. We very foolishly let our subscription lapse for several years thinking we could do without CHEMICAL MARKETS, as it was then called. We realized our mistake and have since renewed our subscription.

We find interesting news on every page of the magazine, the most interesting to us of all being "Abstracts on New Products and New Processes"; as well as the "U. S. Patents." We are enclosing our check for one year's subscription to prove to you we are sincere in what we are saying.

Los Angeles, Cal. H. F. FANTEL.

Deleted by the Censor

You will probably be glad to know that I have received many favorable comments on my January advertisement in CHEMICAL INDUSTRIES.

A few rather important gentlemen in the industry have gone so far as to say that it is the best piece of work for the purpose intended that they have ever seen. One or two have commented that it is quite selfish, as I do not extend my good wishes to those who failed to contribute to my prosperity. The obvious answer is: . . . .!

New York. JOHN A. CHEW.

Some Good Suggestions

It occurred to me that it would be of some interest to have certain articles in your journal from time to time on the following topics, etc.: (I) Reproductions, in translation where necessary, of leading articles from the foreign press which concern the historical and economic development of the chemical industry in those countries. This could well include the emerging industry in newly developing countries. These articles would not need to be of a recent date if pertinent to the subject. When feasible, some little detail of the technical side of affairs, comment by the editors relative to changes in the picture caused by recent events, as well as information concerning leading personalities of the time and available photographs of leaders, process equipment, factories, and laboratories, could be added. (II) Adaptation of the "Column" device of the daily newspapers to such uses as: presentation of the underlying political and economic factors in chemical news of the day, relationships between the chemical industry and the governmental machine in other countries, or reflections about the fields of research activity pursued throughout the world, and the extent of the accomplishments of the various groups of investigators. (III) Presentation of material about allied industries and sciences which are related to chemistry. For example, communications, engineering, physics, metallurgical undertakings, electrical industries, and the like.

These things, of course, are merely suggested extensions of your very interesting articles of the present day.

Cleveland, Ohio. HOWARD E. THOMPSON

Anent Chemical Weed Killers

I am very much disappointed not to find calcium cyanamid mentioned in the article on "Chemical Weed Killers" in your February issue, and I would like to give you a little information concerning calcium cyanamid and the possibilities in its use.

First, may I say that the soils of the Eastern half of the United States are already too acid in reaction to be improved through applications of acids or acid-forming materials. Second, some of the materials mentioned in your article not only kill the weeds but make the soil sterile for a considerable period of time after the material has been applied.

Calcium cyanamid in those uses for which it is effective has the advantage that it has only a temporary sterilizing effect, after which its nitrogen is released for plant food purposes and its lime serves as a corrective for the acidity of the soil.

You will observe that on this basis the farmer secures his soil sterilizing, weed killing, and sweetening effects free of charge. He pays only for the nitrogen which he buys.

New York City. FIRMAN E. BEAR,
American Cyanamid Co.

"Ole Bill"

In the *New York Times* was given an account of the death of Morris R. Poucher. The simple statement that he 'entered the chemical industry in his youth' gives all too incomplete a picture of one whose sagacity, fixity of purpose and determined spirit played so important a part in the creation and full development of the American dye industry.

Prior to the World War his marked ability led to his selection as the chief representative in the United States of the largest of the German dye corporations. Because of this connection he was able to be of great service to our textile industry in successfully negotiating the last shipment of dyes and medicinals which reached this country in German U boats at a time when the scarcity of these products was working such hardships in our industrial life and on the health of our people.

But upon our entrance into the war he broke completely all of his former connections and threw his heart and soul and every ounce of energy into the up-building of an American dye industry, to be forever adequate for the needs of the nation.

His thorough grasp of the subject, his clear vision, his knowledge of men and their motives, and his clever generalship led naturally to that leadership which was always characterized by quiet modesty but untiring effort toward the goal he had set.

He lived to see his dream abundantly become true, and still he labored on to his end for the further up-building of the American chemical industry.

"Ole Bill," as he was lovingly called by his intimates, played his part nobly, though quietly, in the drama of founding a complete, self-sustained chemical industry, which today plays so important a part in the industrial life of the nation.

FRANCIS P. GARVAN
CHARLES H. HERTY

New York City.

CHEMICAL INDUSTRIES

VOLUME XXXVIII NUMBER 3

Just Two Laws More

ALL the great republics of the past have wrecked upon two rocks which, during the past fifteen years, have loomed plainly above our American horizon. On the one hand, the finances are exploited by taxing the sound, prosperous industries and the thrifty, prosperous individuals for extravagant public expenditures for the particular benefit of large, politically important groups. On the other hand, governmental powers are extended and centralized with an increase in bureaucracy and a gradual loss of the citizen's political freedom. This plain lesson History has written in indelible ink, and it makes the shivers run down the spine of any American citizen, who has read and heeded this lesson, to think how far towards those dangerous rocks the course of our Ship of State has been driven during the past three years.

Although it is one of the grave weaknesses of governments in which the people are their own law-makers that they seem to foster a child-like faith in the ability of laws to solve all problems and cure all evils, nevertheless, the republics of the past recognized the dangers of combined bankruptcy and dictatorships, and wise men did devise laws that would have steered them clear of these rocks. Time after time, in Rome and in Venice, these two wise laws failed to pass.

Two of our states, however, have passed these laws, and if acts of the same strong purpose were enacted by Congress, our political liberties would be safeguarded for several centuries. They are very simple. New Hampshire has a law depriving any citizen who is a public employee or a public pensioner of the right to vote. Kansas has a law that no city, county, nor the state itself can appropriate money beyond the demands of the approved public budget without providing that money in an adequate tax.

It is just as simple as that. For, as we are fast learning, the political power of money is not only greater than any force of democracy but it is also potentially destructive to the republican form of government.

A Trio of Giants Christian Zabriskie, Morris Poucher, George Rosengarten—three very great chemical leaders have left us during the past month. Distinguished in widely different branches of chemical industry—Zabriskie, commercial developer of one of the important chemical raw materials for which the United States is world headquarters; Poucher, the dyestuff patriot, without whom our synthetic organic industry could hardly have been established and would certainly not have been preserved; Rosengarten, scion of a distinguished chemical family and himself distinguished for that exceedingly rare combination of sound science and solid business. Borax, dyes, medicinals—in these fields they have rendered to all of us services of inestimable value. They are gone, these three chemical giants, but we shall all of us reap rich rewards from their intelligence, their integrity, their perseverance.

Chemical Standards for Chemical Products That the product of a chemical process ought to be subjected to chemical tests would seem to be the first rule of all who write specifications. Nevertheless, a survey of those drawn up either by the U. S. Bureau of Standards, the Purchasing Agents Association, or the A. S. T. M. inclines a chemical man to the conclusion that this first rule is more often recognized by the breach than by the observance. Many materials of obvious chemical origin are judged only, or chiefly, by physical tests.

A point in instance is the recently approved standards for bookbinders cloth. While the "edition" binders (who bind books for publishers) are chiefly interested in appearance, the "library" binders (who put covers on periodicals and re-bind books) are, on the other hand, vitally concerned with durability. The new standards are acceptable to the former but have been rejected by the library binders. Opinion in these two groups breaks sharply over coated and impregnated book cloths. Library binders maintain that tests should tell them what effect the plastic materials used for these purposes have upon the cloths treated, upon the board cover, and upon the ink and metal leaf they use in printing titles. Specifically they point out cases where impregnated material dries out and the cloth cracks at the edges of the binding, and when a coated material refuses to take the stamp of gold or aluminum leaf. Many such problems, they claim, would be solved for them if definite chemical tests were set up and they had in advance accurate information as to the chemical composition of the various impregnating and coating materials.

Admittedly they are asking for an extremely difficult specification; nevertheless their request, from their point of view as consumers, is reasonable enough. That their contention is well founded is proved by the fact that while they admit these new cloth finishes ought to be extremely valuable to them, nevertheless so many have made disastrous experiments that, as a group, they stick very closely to the older type of book cloth.

From this case of the bookbinders cloth may be drawn a broader maxim. Like the old standard chemicals, the new chemical compounds and specialties are used by consumers to create definite chemical effects. The wise seller gives the buyer the fullest possible chemical knowledge, and the chemicalization of scores of industries will be best furthered if more chemical tests and definite chemical specifications can be set up.

A Subtle Chemist In Scotland and England, at Lehigh University and the Franklin Institute, the two hundredth anniversary of the birth of James Watt has been properly celebrated as that of one of the great pioneers of the machine age. At the ceremonies at his birthplace, Greenock, the grandson of the speaker, who just a century ago laid the corner-stone of the Watt Institution, quoted his grandsire: "We narrow the reputation of Mr. Watt if we consider him only as a great practical mechanic; I believe him to be a profound philosopher and a subtle chemist." So he was, and in the hurly-burly of these trying times, chemical people might pause just a moment to remember that it was Watt, instructed by his friend Berthollet, who induced his kinsman McGregor of Glasgow to make a trial bleaching of 500 pieces of linen with hypochlorite solution. He thus introduced one of the first and most important chemical processes into the ancient textile industry, an epochal step in the use of chemicals in industry, a development that has grown to be the backbone of modern chemical enterprise.

Quotation Marks

Though we seldom see the chemist at work, he is really the man behind the scenes of many of the world's greatest industries. Manufacturers the world over employ chemists to be sure that their customers get the best product they are capable of producing. And during the past half century, these men have saved millions of lives through their work in studying living conditions, analyzing food and water and eliminating harmful bacteria. *Young America.*

Crystal Urea — Its Industrial Uses

By J. F. T. Berliner

Ammonia Department, E. I. du Pont de Nemours & Company, Inc.

UNTIL 1935 the world's supply of synthetic solid urea was largely manufactured in Germany. In 1932 the Belle, W. Va., plant of the Ammonia Department, E. I. du Pont de Nemours & Co., Inc., began shipments of urea-ammonia liquor or "Ual", essentially a solution of crude urea in ammonia, for use in the ammoniation of superphosphate fertilizers (1). Late in 1935 this plant began the first commercial production of solid urea in the United States.

During the World War, as an emergency measure, small quantities of urea were manufactured in Canada and by the du Pont Company from calcium cyanamide. A pilot plant for the production of urea by the hydrolysis of calcium cyanamide was operated at Niagara Falls (2) in 1925 but did not attain commercial development.

Urea is now manufactured from ammonia and carbon dioxide. Crystal urea, the term being applied to the urea produced in the United States, differs from the imported commercial grade by being purer, freer from foreign matter, and by being crystallized in uniform, small, short prisms instead of the familiar long needle-shaped crystals. Crystal form is important in handling, transporting, and storing. It promotes freer flowing and freedom from caking due to crystal matting.

Urea is a white, well-crystallized substance with a cool, saline taste. It melts with decomposition at 132.7° C. (270.9° F.), is very soluble in water, methanol, ethanol, and liquid ammonia, but practically insoluble in ether and hydrocarbons.

Prior to the War, urea was imported in small quantities, primarily as a fertilizer and as a stabilizer for pyroxylin plastics. On September 21, 1922, the *ad valorem* duty of 25 per cent. was increased to 35 per cent. and on June 18, 1930, all import duty was removed. Besides the technical and fertilizer grades, urea is also imported to a small extent as "Calurea", a fertilizer material $Ca(NO_3)_2 4CO(NH_2)_2$ containing 60 per cent. urea by weight. The imports of all grades since 1925 are given in the following table:

Urea Imports into Continental United States (Exclusive of "Calurea") in Short Tons

Year	*Imports*	*Year*	*Imports*
1926	189	1931	7,275
1927	407	1932	4,592
1928	894	1933	5,004
1929	2,290	1934	4,535
1930*	10,291	1935	3,765

* Import duty of 35% removed June 18, 1930.

While it is difficult to allocate the distribution of imported urea, it is estimated that at present about 40 per cent. is employed in fertilizers and about 35 per cent. in the manufacture of urea-formaldehyde resins. The manufacture of urea resins, beginning about 1930, consumed 750 tons of urea in 1932 and, in 1935, somewhat more than twice this amount.

The industrial importance of urea is rapidly growing and its uses are many and varied. It finds application in medicine, textile printing and delustering, fireproofing, fermentation processes, in the manufacture of adhesives, varnishes, enamels, pharmaceuticals, pyroxylin, plastics, cellulose ethers and esters, dyes, explosives and for a number of other purposes. The recent advent of a dependable domestic supply is already stimulating the industrial development of a number of new and important uses.

In the Fertilizer Field

Though resin may soon win first place in urea consumption, its use as a fertilizer has up to the present been its largest outlet. Despite the higher price of synthetic solid urea per unit of nitrogen as compared with ammonium sulfate and sodium nitrate, present sales for fertilizer purposes amount to from 1,500 to 2,000 tons a year. However, in urea-ammonia liquor the price per unit of nitrogen is the same as ammonium sulfate. The fertilizer value of urea has long been recognized, and it is the source of more than half the nitrogen of farm manure, man's oldest and most widely-employed fertilizer. Urea has established advantages over all other commercial sources of fertilizer nitrogen (2a).

Extensive fertilizer experiments conducted by state and federal agencies have shown that it is an excellent source of nitrogen for various crops grown under a wide range of soil and climatic conditions. When applied to the soil, urea is rapidly converted to ammonium carbonates and thus its initial effect is to reduce soil acidity. Both urea and the ammonium carbonates are highly available to crops and resistant to loss by leaching. The use of urea slightly increases soil acidity, but the amount of residual acid is only one-third that produced by an equivalent amount of nitrogen from the commonly-used ammonium salts.

Being less hygroscopic than some common fertilizer salts, it can be used in large quantities in mixed fertilizers without adversely affecting their physical properties. The mechanical properties of crystal urea make it satisfactory for use for top or side dressing for row crops.

The urea-formaldehyde resins industry in the United States has grown from practically nothing in 1930 to probably more than 3,000 tons of actual resin (exclusive of fillers) in 1935. These resins have high transparency and lustre and can be formed into articles that are colorless or have unusual depth of color translucence and brilliance.

That urea and formaldehyde condense was first observed by Schiff (3) in 1869. The groundwork for our present knowledge of these reactions was established through the investigations of Goldschmidt 1896, and Einhorn 1908. The first patent was obtained by Goldschmidt (4) in 1897. What many considered the basic urea resin patent was issued to John (5) in 1918, but due to incomplete coverage, the inventor's misinterpretation of his results, and the peculiarities of the English patent law, John was not able to protect his invention and Pollak (6) was granted a patent in 1919 which gave him a hold on the field. Then followed over 800 United States and foreign patents covering various modifications and methods of production as well as combinations of urea resins with many other substances including other resins such as nitrocellulose plastics, glyptal, phenol-formaldehyde, vinyl and natural resins (7).

The primary reaction of formaldehyde and urea is the formation of the water-soluble crystalline monomethylol- and dimethylolurea.

$$NH_2{\cdot}CO{\cdot}NH_2 + CH_2O = NH_2{\cdot}CO{\cdot}NH{\cdot}CH_2OH \quad \text{methylolurea}$$

$$NH_2{\cdot}CO{\cdot}NH{\cdot}CH_2OH + CH_2O = CO{\cdot}(NH\,CH_2OH)_2 \quad \text{dimethylolurea}$$

Application of heat or catalyst, or both, causes further reaction, the methylolurea condensing with itself to form larger and larger molecules. As the reaction continues, the product passes from true-solution to colloidal-solution and finally to the hard water-insoluble resin. Further treatment with heat, as in the molding operation, forms an insoluble, infusible resin. Urea formaldehyde resins are materially improved in strength and permanence by the addition of other materials, especially cellulose, as wood flour, pulp, and the like.

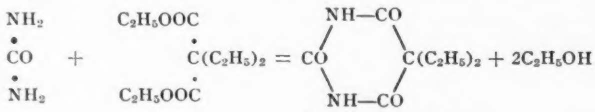
The most important present outlet for the urea resins is in molded ware such as electrical fixtures, container closures, automobile hardware, tableware, novelties, and an evergrowing variety of articles. Intermediate condensates of urea and formaldehyde can be obtained as solutions in non-aqueous solvents such as the butanols, chlorhydrin and organic esters, and in this form are valuable components of coating compositions (7). Metal lacquers, varnishes, sizings for wood, leather and rubber, wire-insulation enamels, impregnants for electrical insulation, and coloration of electric light bulbs (14) are some applications for urea-formaldehyde-containing compositions.

Aqueous solution of the primary condensations of urea and formaldehyde are colorless and can be prepared in varying concentration and fluidities. In this state they are employed in the impregnation and lamination of paper and fabrics, adhesives and bonding agents for composition wood, asbestos and fibre board, abrasives (13), cork meal, safety glass, and linoleum cements, preservation of latex, and for numerous other purposes (7). The use of urea-formaldehyde condensation products for the "induration" or resin impregnation of wood (8), as adhesives in the production of composition board, plywood and wood veneers (9), and in the production of crease-resisting fabrics, are developments that may become important outlets for this product. Among the plastic developments few are more interesting than the impregnation of wood, combining the advantages of plastics and of wood and adding thereto advantages possessed by neither alone (10).

Fabrics treated with small amounts of water soluble urea-formaldehyde condensates, and subsequently subjected to heat to form the resin in the fibre, are rendered surprisingly resistant to creasing and crumpling (11), does not affect their suppleness or make them harsh or stiff and reduces the tendency of the textile to slip and to shrink when laundered. This process is finding application in the treatment of cotton, silk and rayon fabrics. Applied to wool, silk or fur, it reduces their deterioration by alkaline media (12), such as encountered in scouring and dyeing operations.

Pharmaceuticals from Urea

While urea and some of its salts such as urea salicylate, hydrobromide, and oxalate, find limited use in the treatment of liver and kidney disorders, pleurisy, dropsies and the like, astonishingly large amounts of urea are employed in the manufacture of the malonylureas or barbituric acid derivatives, widely employed soporifics and sedatives. The malonylureas are obtained through the interaction of urea and substituted malonic acid esters, for example diethylmalonylurea or diethylbarbituric acid, which is Veronal or Barbital, is obtained from diethyl malonic acid ethyl ester and urea:



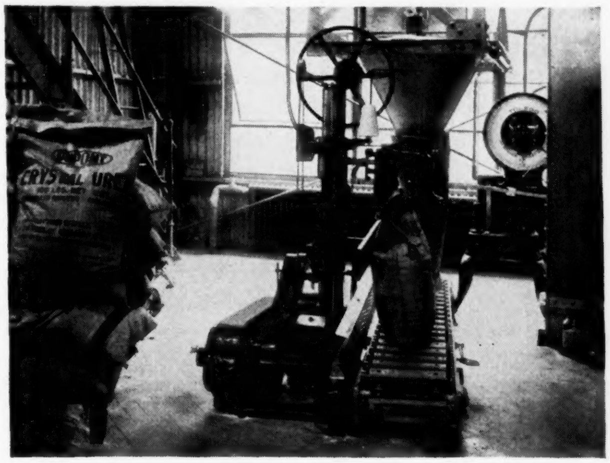
Urea — diethylmalonic acid ethyl ester — Diethylmalonylurea or Diethylbarbituric acid. "Barbital" or "Veronal"

Similarly, Allonal contains the allyl isopropyl derivative; Luminal and Phenobarbital, the ethyl phenyl derivative; Dial, the diallyl derivative, etc. Well over 100 tons of urea are annually employed in the manufacture of these preparations. A survey reveals that approximately four hundred (16) barbituric acid derivatives are known, about a dozen being now in common use (15). A prescription ingredient survey for 1931 revealed fifteen million prescriptions calling for these compounds (17).

The malonylureas have been suggested as plasticizers for cellulose ester compositions (21).

Urea forms a stable addition compound with hydrogen peroxide that has attained wide use, especially in Germany, as a disinfectant and mouth-wash (18) under trade names such as Ortizon, Hyperol and Perhydrit. Urea and urea derivatives have little or no mothproofing value (19). However, a talc-like powder resulting from the interaction of urea and metacresol is claimed to be a singularly effective disinfectant (20).

Urea introduced into aqueous solutions of animal glue, gelatin (22), casein (23), or starch acts as a liquefying agent, rendering the solutions more fluid or allowing a reduction of the water content without decreasing the fluidity of the solution. The setting or jellying temperature of the solution is lowered and the adhesive when dry has higher strength, flexibility, and hygroscopicity. Glues treated with urea may be applied to non-rigid materials such as paper and cloth without causing the material to curl when the glue is dried. Glues rendered insoluble through treatment with formaldehyde may be reclaimed or rendered soluble by treatment with urea (24). The unusual property of reducing the viscosity and lowering the setting temperature of glue and gelatin solutions is useful in the preparation of duplicator sheet compositions (25) and in the preparation of dilute stable emulsions from thick or solidified glue or gelatin emulsions (26).

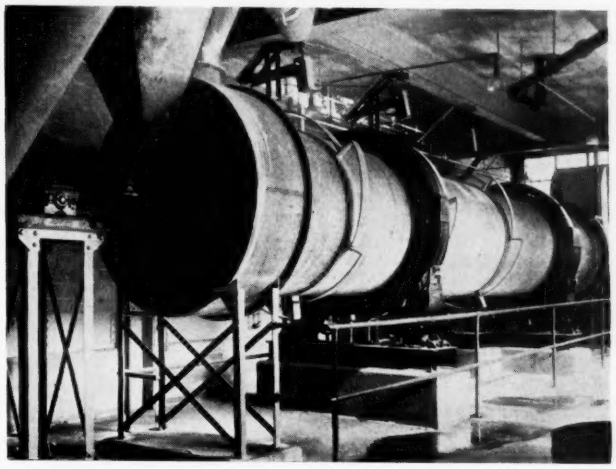


Bagging Equipment.

Urea acts as a stabilizer in starch adhesives and allows a reduction in the amount of oxidizing agent employed as well as permitting a smaller amount of water for a given fluidity. Urea has a peculiar retarding influence on the initial evaporation of the water from the glue in that it does not interfere with the quick setting effects produced by the smaller amount of water but delays the inception of the quick-setting action (27). This has been found particularly advantageous in the gluing of plywood, bentwood, veneers and the like.

A condensation product of urea, zinc chloride and urea is claimed to be an excellent water-proof adhesive or laminating agent for sheet material such as wood veneer, asbestos board, cloth, paper, wire cloth, etc.(9). As has been mentioned, urea-formaldehyde resins also find application in this field. Urea-treated starch, casein and glue adhesives are recommended as improved sizing agents for wood, paper and cloth. Paper impregnated with urea-treated casein produces a transparent, shiny, impervious product (29). The addition of urea-formaldehyde resin to animal glues renders the glued joints more water-resistant (28).

The fact that urea combines with oxides of nitrogen given off by the slow decomposition of nitric esters has been known since Hase (32) in 1855 described its use for correcting acidity in photographic film. Urea and urea derivatives have been used as antacids to improve the stability of nitroglycerine, nitrocellulose and nitrostarch (33) base explosives as well as of nitrocellulose base plastics. At one time urea was a constituent of certain American military explosives but was discontinued as under some conditions it is too active and tends to promote nitric ester decomposition. At present, though urea itself finds practically no use in explosive compositions, tetra substituted ureas ("Centralites") are employed to a considerable extent for coating and impregnating nitrocellulose explosives, acting as detonation retardants. Leonard in 1893 first claimed (34) the use of urea crystals as a neutralizer of free acid in gunpowders composed of nitroglycerine, and gun cotton. Similarly, Schüpphaus the following year (33) employed ½ to 2 per cent. urea as a stabilizer and neutralizer to prevent decomposition in nitro compounds, particularly pyroxylin. Later, patents covering the use of tetra-substituted ureas as stabilizers, gelatinizers (35) and detonation retardants were issued (34). Urea sulfate (36) and a number of other urea derivatives are claimed to be effective in stabilizing nitro compounds for use in explosives and plastics (37).



Dryer in the crystal urea plant.

Andrews (30) found that urea in the nitrating mixture, as well as in the material to be nitrated, checks or reduces the oxidizing action of the nitric acid without reducing its nitrating power, resulting in a saving of acid and a more stable product free from both nitrous acid derivatives and urea. It is claimed that the process is applicable to the preparation of nitroglycerine, nitrocellulose and other organic nitro compounds. Urea

has also been used in the washing of nitrocellulose after nitration (39).

Considerable study has been devoted to the use of urea in the stabilization and colloiding of nitrocellulose and nitrocellulose plastics (40, 21). Atsuki (41) found that besides stabilizing the nitrocellulose in plastic compositions that urea used in proportion of about 7 per cent. acted as a plasticizing agent and improved its stability towards heat. Urea is used as a stabilizer in nitrostarch explosive base detonators (31).

Urea acts as a stabilizer for ammonium nitrate, perchlorate and gelatin-nitroglycerine explosives (42). A fused mixture of urea and ammonium nitrate with or without other nitrates is claimed to be an effective means of impregnating combustible carbonaceous, absorbent materials in the manufacture of dynamite compositions (43).

Urea nitrate is a powerful explosive and considerable study has been devoted to this compound. It is readily detonated and shows high deformation in the lead-block test. Though it is somewhat unstable, patents have been issued for its use in explosive compositions (44).

Probably the first recorded patent concerns the use of urea in the manufacture of explosives. Queen Elizabeth of England on August 8, 1561, granted to Philip Cockerman, mercer, and John Barnes, haberdasher, a ten-year monopoly patent agreement on the process taught them by Captain Gerrard Honricke (commissioned by the Queen on March 13, 1561) for the production of saltpeter for gunpowder from ". . . Urine, namely of those persons whose drink is either wyne or strong beare". England was forced to such extremities because she depended mainly on the Netherlands, then a dominion of Philip of Spain, for saltpeter and a less precarious source was required.

Textiles and Cellulose Ethers and Esters Compositions

Urea is finding increasing employment in the textile industry, especially in textile color printing in printing pastes, as a mordant aid, opacifier, color intensifier and for increasing the fastness and fixation of color. It is also used in delustering, stabilizing, plasticizing, coagulation, flame proofing, softening, dyeing, selective dyeing and in the preparation of cellulose ethers and esters. Its presence in ret water hastens this slow biologic process in vegetable fibres (45). In wool dyeing, urea condensation products prevent alkali destruction of keratin (46), and its presence in the wash liquor for colored textiles is claimed to prevent loss or running of the colors (47).

Recently urea as a constituent of printing pastes and as an aid in color printing has been the subject of numerous patents. It is claimed that improved fixation and fastness is obtained in printing mordant colors on cotton (48) and a wider range of colors may be employed. Fuller bodied shades are obtainable with vat colors (49) and substantive dyes (50) when urea is present in the printing paste. The value of urea as a printing auxiliary lies to some extent in its hygroscopic properties which compensate for variations in humidity conditions (51).

Urea is employed in obtaining white or colored matt effects and in reducing lustre on yarns or fabrics by printing or treating with urea solutions thickened with tragacanth or similar agents and subsequently heating. The quantity of urea employed governs the opacity of the resulting fibre. Urea derivatives and urea-formaldehyde condensates have also been employed for this purpose (52).

Urea acts as a softening or swelling agent, assisting the penetration of dyes into fibres having low porosity such as highly etherified celluloses (53). The receptivity of cellulose ester yarns and fabrics for loading agents is increased by this swelling action (54).

Urea has been suggested as a constituent of coagulating solutions for the production of films and filaments of cellulose and its derivatives (55) and in the wet process for acetate silk (56). A number of patents exist on the use of urea and some of its derivatives as antacids and stabilizing agents in cellulose acetate and nitrate compositions (57). Urea is a particularly desirable antacid for use with cellulose acetate as it has no saponifying effect (58) and contributes a plasticizing action (64), making it adaptable for use in safety glass composition (65). Cellulose nitroacetate may be prepared by acetylation in the presence of urea (59).

Urea and urea derivatives have long been used for flame proofing textiles and cellulose base films (60). Incorporated in cellulose acetate lacquers, urea produces a frosted effect on the dried film (63).

Uses in Shellac

The Indian Lac Research Institute has found (64) that the addition of 2 to 5 per cent. urea or thiourea to shellac resulted in considerable improvement in the water resistance, hardness and resistance to abrasion of the shellac film. The urea also acted as a plasticizer, markedly improving the flexibility and adhesion of the varnish film. Since only 0.55 per cent. water-soluble material was extracted by a 72-hour immersion in water of a shellac film containing 5 per cent. urea and 0.33 per cent. natural occurring water solubles, it is suggested that urea reacts chemically with some constituent in the shellac. Urea has also an accelerating action on the heat curing of shellac in molding operations, although other bases (with the exception of ammonia) have a retarding effect on the polymerization (65).

Urea in Tanning

Aqueous solutions of urea and formaldehyde or condensation products of these materials have desirable tanning properties for producing leather, especially white leather (66), condensation products of urea and aldehyde with phenol (67) and lignin sulfonic acid and other sulfonates (66, 68) have also been suggested. Solutions of urea-aldehyde condensation products with free bases of basic dyestuffs have been considered for

the dyeing or redyeing of leather (69). A 50 per cent. solution of urea with 1.5 per cent. potassium thiocyanate whitens leather (69a) and a solution of urea and sodium sulfide is recommended for liming pelts and hides (69b).

Rubber and Porous Articles

On heating, urea is decomposed into gaseous products and advantage is taken of this in the preparation of porous articles. Urea has been found specially suitable in the preparation of sponge rubber in that a uniform cell formation is obtained with no injurious effect on the rubber. The urea is added on the mixing rolls. If a sponge rubber is desired, 15-20 per cent. urea is employed and the rubber vulcanized at 122° C. for 45 minutes. If a microporous rubber product, such as for erasers, is desired 7-10 per cent. urea is incorporated and the mixture vulcanized at 143° C. (70). An analogous use is in asbestos or other insulating covering of electric conductors. On heating, the urea evolves gases which serve as arc extinguishing agents (71).

This property of urea has also been suggested for leavening bread. Urea or mixtures of urea and Karaya gum have been described as baking powders (72) and the use of urea hydrogen peroxide compound is stated to also improve the gluten of the admixed flour (73). Urea phosphate may be used as a substitute for acids in baking powders and in lemonades (74). An interesting use, dependent on the release of ammonia from urea on heating, is the removal of catalyst taste from hydrogenated oils and fats (75). The presence of urea may also improve the hardening of oils and fats (75a).

Urea and urea peroxide are claimed to act as catalysts for the polymerization of butadiene hydrocarbons to rubber (76). Urea compounds have found application as vulcanization accelerators for rubber and numerous patents have been granted on this use (77). Urea has been suggested as a latex preservative and as a viscosity control agent for latex impregnating solutions (78).

Urea as a Food

Urea is an excellent nutrient and source of nitrogen for yeasts and other micro-organisms and has long been used for bacterial cultures (79). Urea stimulates growth of yeast due probably to the ease and rapidity of assimilation. This has led to its increasing use in the brewing, wine and liquor industry and in the manufacture of alcohol and commercial yeast (80).

According to Brigl and Windheuser, silage of improved quality is obtained when urea is added to corn and beet tops before fermentation (81).

That urea can replace the digestible protein in animal food, though paradoxical, has been firmly established. Extended investigations on its effects in the diet of cows, horses, sheep, goats, hogs, and man were begun by German investigators soon after the War (82). One fundamental difference between the vegetable and the animal is that the latter can not build protein; that is, cannot directly assimilate inorganic or simple nitrogen compounds. However, urea on entering the body is converted to protein by the intestinal bacteria and this bacterial protein is then consumed by the organism. Half the nitrogen requirements of ruminants can be replaced with urea and 30 per cent. is recommended. Animals thrive well on urea feeding and in general an increase in the volume and quality of milk of cows and goats is noted. Urea is capable of supplying the greater amount of the nitrogen required for flesh formation in growing animals.

Moore and co-workers fed 35 to 52 grams of urea daily, representing about 10 per cent. of nitrogen requirements, to three normal individuals and noted no increase in nitrogen in the excreta or in the blood, indicating its assimilation as food (83).

Heretofore the cost of urea compared to other sources of nitrogen has resulted in little or no practical application of the knowledge that urea can be used as a food. However, it is intriguing to consider the future, for now the price of urea is decidedly below that of nitrogenous feedstuffs. This holds some promise of developing into an important outlet for urea.

Miscellaneous Uses

The uses for urea are so varied and so numerous that to classify them must eventually, perforce, result in a "Miscellaneous Section." Some further interesting and important applications for urea are:

Dyestuffs: urea is employed as a means of eliminating nitrous acid from reactions and products and controlling diazotization reactions. It finds application in the preparation of certain azo and sulfur dyestuffs such as Benzo Fast Yellow and replaces dextrin or other materials as a color strength adjusting agent (standardization) of basic dyestuffs (84).

Solutions and Crystallization: urea has the remarkable property of materially increasing the solvent action of water and other solvents for a large number of solutes. Highly concentrated and stable super-saturated solutions may thus be prepared. This property is of value in electroplating, impregnation of textiles for fireproofing, in increasing the leaching efficiency of solvents (85), and other purposes. Urea has a strong tendency to form additional compounds with many substances and thereby alter their solubility. Some applications of this property are in the separation of metacresol from crude cresol mixtures (86) and in the preparation of stable, non-deliquescent, highly water-soluble copper salts by forming urea addition compounds with copper nitrate and copper chloride (87). Urea effects the solution of some insoluble fungicides and bactericides (88).

The crystal size or form of a number of substances may be altered by the addition of urea to the solution from which the crystallization is being effected. The addition of 2 or 3 per cent. urea to an ammonium sulfate solution produces large coarse crystals (89). Urea materially affects the crystal form of sodium chloride (90). Urea solutions have been suggested for use

as cooling brines or anti-freeze solutions having as one advantage the fact that should the solution boil to dryness, the urea will decompose into gaseous products and not clog the system (91).

Formaldehyde: methanol is usually employed to retard or prevent the polymerization of formaldehyde in aqueous solutions. It has been found that the presence of 5 to 10 per cent. urea effectively stabilizes formaldehyde solutions (92). Urea-stabilized formaldehyde is particularly adapted to urea-formaldehyde resin manufacture since the stabilizing urea becomes part of the urea required for the reaction. When methanol-stabilized formaldehyde is employed, the methanol is either discarded or recovered, but is of no value in the reaction.

Among other suggested applications for urea may be mentioned acetic (93) and formic acid concentration (94), production of hydrazine (95), manufacture of alkaline earth cyanates (96), as a stabilization (97) and anti-knock agent (98) for gasoline, nitriding of steel (99) and as a component of a novel fire extinguishing solution wherein the urea is decomposed to nitrogen and carbon dioxide through interaction with nitrous acid (100).

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Copper Production 1935

Preliminary statistics on copper production, foreign trade, prices and smelter and refinery stocks in 1935 indicate marked improvement over '33-'34 in certain phases of the copper industry. Smelter production from domestic ores increased 53 per cent. over '34 and the estimated output for December was 60 per cent. higher than the average for the 11 preceding months. Production of primary refined copper from domestic and foreign sources showed a gain of 33 per cent. over '34 and the proportion of foreign to domestic copper in U. S. refinery output declined in '35.

Chemicals are Bought—Not Sold

By C. H. Hazard

President, Hazard Advertising Corp.

LAID end to end, there is nothing to distinguish the chemicals of one manufacturer from those of another. Further to complicate the sales problem, containers, prices, and other considerations are usually fairly comparable. The only tangible difference, then—the only advantage one manufacturer can hope to have over another—is the reputation which accrues to him through the policies and methods he employs in the conduct of his business. Personality is tremendously important, too, but it is the corollary of the other.

According to Webster, reputation is the estimation in which one is held. Now there are many honorable and estimable people whose reputations are known to only a few. In business the spreading of one's reputation is not immodest. It is proper and legitimate. Indeed, it is well nigh imperative in this intensely competitive age.

Especially is this true of the chemical business. That quaint old mousetrap theory doesn't apply here at all. Can you imagine the manager of a chemical business alibiing to his stockholders poor sales or no sales in these terms? "While the nature of our business is such that we can't claim to make the world's best mouse—excuse me, chemicals, it is a fact that our quality is unexcelled. That being so, it is our considered judgment that your interests will be better served if we devote ourselves entirely to maintaining high standards of quality, improve our technical equipment, and save the money our competitors are spending in the luxury of costly sales organizations with supporting sales promotion activities."

Virtue No Longer Its Own Reward Unfortunately, this "virtue is its own reward" attitude prevails too generally in the chemical business. This is natural, perhaps, because the technicians have so much influence. By temperament and training they are so factual minded that it seems inconceivable to many of them that it is necessary to do any more than make a good product. Oh, yes, as a concession to management, they suppose there might be someone calling on the trade and they might even indulge in a little well-restrained advertising. If these gentlemen were kept in the plants and the laboratories; if they would let the extroverts run the business, the progress of many companies would be accelerated. What the chemical industry needs is the application of real sales technique.

To get back to reputation, the personality of a business, and the like: there are several channels through which reputations are spread. Undoubtedly the most important are personal representatives and advertising. These are reasonably controllable and offer the most potential means of contacting customers and prospective customers. Personal contact and its influence cannot be gainsaid, and it is so largely responsible for chemical sales, we may pass quickly from it to a less obvious and therefore a less appreciated field—advertising.

Three Contact Points The chemical manufacturer has three points of contact with the people whom he sells or hopes to sell—his salesmen, his correspondence, his advertising. On these three rests the responsibility of projecting the personality of the business. They *are* its personality. They are the reputation spreaders. By them and through them a firm is judged. They interpret the business and translate it into the interests of the customer. How else can a buyer know his source of chemical supply, unless he happens to take the trouble to visit its offices and plants?

In the case of chemical staples, there being so little that is distinctive, the problem of making advertising effective is not a simple one. But while it may not be descriptive as to product, it can be interesting and informative as to the ideals and facilities of the people who sponsor the product. It can reflect the attitude of mind—the business philosophy, if you please, of the company it represents.

It can, by intelligent presentation, speak more eloquently than the average salesman and to more people, because it reaches executives behind the scenes, men the salesman doesn't know, never sees. Many of the most influential factors in the purchase of chemicals are inaccessible to salesmen. Advertising is just about the only way that they can be reached.

Good Advertising Radiates Quality Good advertising can by suggestion and atmosphere radiate quality. Claiming quality for oneself isn't impressive. It is pompous and lacks conviction. A gentleman doesn't have to prove that he is one. So with advertising. It can subtly and gracefully reflect all characteristics we associate with quality. And since our reaction to advertising is the result of an accumulation of favorable impressions, the advertiser's only concern is that his advertising be good, that it be consistent, and that it be continuous.

Advertising should be created with all the skill and thoroughness of an important document to be published over the company's signature, for it is essentially that. It should be prepared with the same painstaking care that one puts into a public address. Anything less is unworthy of its author and uncomplimentary to those by whom it is intended to be read. Otherwise, the implication is too clear—the advertiser is either lazy and indifferent, minimizes the reader's intelligence, or he isn't sufficiently interested in the reader's good will to make a sincere effort to earn it.

Don't Underestimate the Reader On the other hand, a common fault with some advertising, as with some salesmen, is that it bears down too hard . . . the touch is heavy. In the absence of substance and the specific, and in order to attract attention, it waves arms, makes faces, and shouts hysterically. The power of suggestion is completely unknown to heavy-handed sellers. They don't recognize that a casualness of attitude, the confidence and assurance it conveys, may be more effective than loud, vulgar pyrotechnics.

Fifteen years as advertising counsellor, handling over a million advertising dollars for some of the industry's large chemical manufacturers, is responsible for a firm conviction that chemical advertising can by suggestion, through its physical appearance, and by graceful expression, contribute something to the success of a company that no other force offers. It doesn't intrude itself on the reader; it invites his attention and enlists his sympathetic interest. It is most likely to be read when the prospect is relaxed—quite in contrast with his attitude when resisting a salesman. The salesman represents a challenge, but the advertisement need not be "interviewed" unless the reader so desires. There is a difference.

Advertising wields an influence incomparable with any other force in selling. Even though you knew *all* of the people whose good will and confidence are important to you and your salesmen were reaching them all, advertising could still contribute something to produce a state of mind without which effective selling is impossible. Advertising is the personality, the visible manifestation of a group of people—of the collection of mortar, bricks, and equipment which we call business. Without it no business is realizing to the full on its investment. Good advertising reflects the character, the ideals, the principles of a business, as a good bank balance indicates its financial strength.

Economical and Efficient Moreover, advertising is the most economical way of contacting customers and prospects. It reaches more people per dollar and in a unique manner, peculiar to its psychological advantage over any other form of selling.

The importance of its message to him, the charm of style and the taste with which it is written, the high artistic quality of its design, all should combine to give the reader a distinctly pleasant reaction to the advertiser and his product. These reactions are almost entirely subconscious. Few people analyze an advertisement to discover why they like or dislike it. Those which have impressed them favorably are stored away in the subconscious mind. This storehouse of impressions is brought forward into sharp focus when a decision is being made.

An eminent psychologist recently referred to our "forgettery" and suggested that advertising should be regarded more for its emotional appeal; that it should be directed "less to the head and more to the heart." What he was saying, presumably, is that it be an irresistible assault on the "forgettery," bringing into play all subtle as well as obvious influences that sell.

Our feeling of familiarity with and confidence in people or things is a matter of impressions—favorable impressions. Our judgment of a company and its products is based on these subconscious impressions which we have in some way acquired. We couldn't tell why we trust one person more than another.

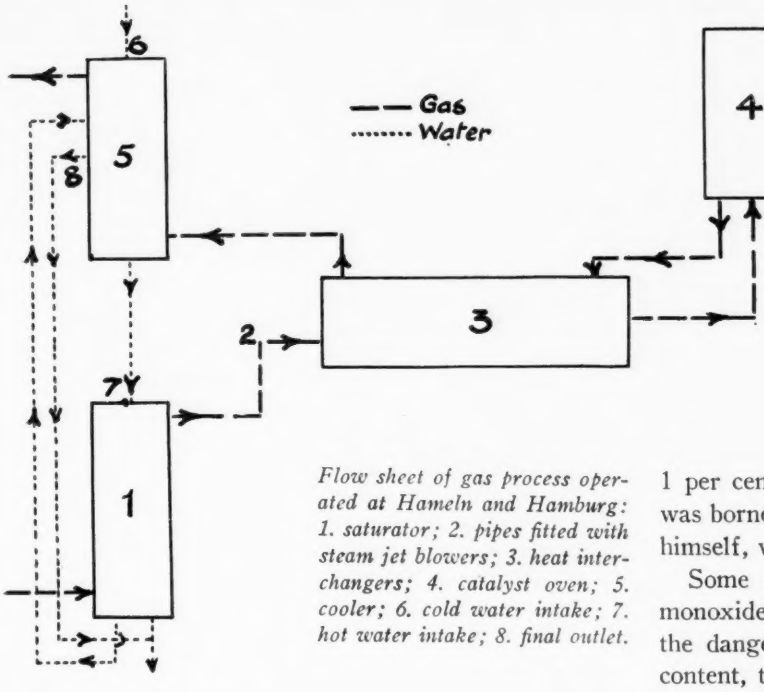
Here's the Prescription "All right, Mister," you are probably saying by now, "what would you do if you were a manufacturer of chemicals?"

Here's what I'd do: 1—I would do my absolute darndest to understand a sales force in which American business last year invested over $400,000,000; an influence which increased earnings on invested capital from 3.6 per cent. to 8.2 per cent. in 1934 (non-advertisers vs. advertisers). I would determine what potentialities this modern sales tool has for my business. 2—Having satisfied myself that it is something my business would benefit by using, I would give advertising the consideration it deserves and establish a permanent policy to include it as an essential investment in good will and future security. I hold as tenaciously to this policy as I do to others, as for example, insurance, legal counsel, plant amortization—even more so, because my plants can burn down and be replaced with less cost, inconvenience, and delay than a reputation can be restored. 3—I would employ the most competent talent I could find—people who by intelligence, experience, integrity, and interest were worthy of the responsibility of directing so important a phase of my business, and I would demand as high a yield on my investment as if it were in patents, materials, or plant facilities. 4—I would vest these people with all the authority necessary to assure them the respect and cooperation of the entire organization. They would be responsible only to the Board of Directors. I would see to it that perfect understanding and sympathy existed between the advertising people and the sales organization, effect a tight and balanced coördination between all those who were in any way responsible for sales promotion and public relations. 5—I would strive for a state of mind on my own part and on that of my associates that would assure our approach to the subject of advertising without mental reservations and without our fingers crossed; not with the idea of how much we might save by not advertising but with the determination to know *how much* advertising we should and could do profitably.

James J. Montague, in his syndicated column, recently submitted a fable: "Once upon a time there was a man who said: 'Goody! Goody! This year I'll have a bigger income tax to pay'." When chemical manufacturers reach that Utopian state and will say: "Goody! Goody! This year I can do more advertising," a new era will have dawned, broader fields of public service opened and increased profits will result.

Making City Gas Non-Poisonous

By Frederick H. P. Schultz



Flow sheet of gas process operated at Hameln and Hamburg: 1. saturator; 2. pipes fitted with steam jet blowers; 3. heat interchangers; 4. catalyst oven; 5. cooler; 6. cold water intake; 7. hot water intake; 8. final outlet.

INTEREST is being shown, particularly in Europe, in making illuminating gas non-toxic by eliminating the carbon monoxide, or at least bringing the CO content down till the gas, to all intents and purposes, is non-poisonous. The only practical application of the process so far is in Germany, where the carbon monoxide is treated by catalytic oxidation to form carbon dioxide with the aid of steam.

The carbon monoxide content of illuminating gas varies almost from city to city, but in Germany there has been a steady increase in the last thirty years from 8 to 20 per cent., or a slight decrease in hydrogen content and a decrease of nearly 50 per cent. (from 47 to 55) in methane content. According to Dr. Wilhelm Bertelsmann, in *Gas Journal*, the greatest jump in the carbon monoxide content occurred during the war when, in consequence of the scarcity of coal, German gas plants were compelled to use water gas as a diluent for coal gas. This period of scarcity taught them, however, that the poorer gas, from the point of view of calorific value could be used in suitable gas apparatus with greater economy than the richer pre-war gas. Consequently, the poorer gas was continued. The gas retained its high carbon monoxide content and its great toxicity. This has been utilized as propaganda in favor of electricity.

These factors are largely responsible for the decision to attempt detoxification. There were, of course, other considerations. If the CO content is reduced to 0.2 per cent., the gas is still lethal if directly inhaled from a tube. On the other hand, a gas containing 1 to 1.5 per cent. CO is probably not fatal if gas taps were turned on in a room with ordinary natural ventilation. This has been proved by direct experiment and is supported by two *bona fide* unsuccessful attempts at suicide by inhaling a city gas with a CO content of about 1 per cent. That these two suicides were determined was borne out by the fact that one subsequently hanged himself, while the other chose drowning.

Some authorities claim that reducing the carbon monoxide content below 1.25 per cent. would increase the danger of accidental gas explosions. Above this content, the physiological effects of the gas, as shown by a definite feeling of uneasiness, would make themselves felt before the concentration of gas in a room reached that of an explosive mixture. Below this content, however, the explosive mixture would be reached before uneasiness was felt. In the latter case, a match might inadvertently be struck and an explosion result. The smell of the gas might give sufficient warning. If, however, the gas leakage was slight but cumulative, the gradually increasing smell might not be noticed while gas entering a house through underground leakage is often practically odorless. Thus, a careless consumer, thinking that the detoxification renders gas foolproof, might forget that its explosive properties are retained. Statistics show that, in Germany, of all deaths from gas alone, only 16 per cent. are accidental, while 84 per cent. are suicides. Further, of all fatal accidents from all causes (excluding suicides) only 2.6 per cent. are due to gas, while 32 per cent. are due to traffic accidents. It is generally agreed, both for the above and for economic reasons, that reducing carbon monoxide content to 1-1.5 per cent. represents the most satisfactory limit. Such reduction thwarts many of the less determined suicides and will practically eliminate chances of accidental gas poisoning. To reduce the CO below this figure involves greatly increased consumption of steam in the process and hence high operating costs.

Before detoxification was decided upon in Germany, two processes were studied exhaustively. One is a one-stage operation, while the other involves two stages.

In the single-stage process, the gas to be treated passes up a tower in which it is saturated with water vapor by being sprayed from the top with hot water. The water absorption is assisted by injecting steam after the tower from a steam jet blower, the total water vapor required being six times the weight of carbon monoxide in the gas. The mixture of gas and water vapor passes

through a heat interchanger, where it receives heat from the gaseous products leaving the reaction vessel, and thence into the reaction vessel containing a catalyst. Here it is heated to about 380-400 deg. C. and the carbon monoxide and water vapor react to form hydrogen and carbon dioxide, which latter is subsequently scrubbed out if desired. The treated gas passes back through the heat interchanger, is cooled with water in a tower cooler, and passes through an oxide purifier (to remove hydrogen sulfide formed in the process) to storage.

The process presents no difficulty and is simple to operate. No special supervision is required beyond periodical recording of temperatures and occasional regulation of flows. At first, the temperature of the reaction vessel was maintained electrically, but it is cheaper to admit a regulated amount of air to the gas before treatment so that a small proportion of the gas is burnt inside the reaction vessel. A German authority, Dr. Gerdes, states that it is sufficient to burn about 1½-2 per cent. of the gas in this way, but others consider this to be a low estimate.

In the two-stage process, now being studied at one of the largest gas plants in Germany, part of the carbon monoxide is destroyed by the same method as in the one-stage process, the hydrogen sulfide produced is removed, and the gas is then passed over a heated nickel catalyst which converts the last traces of carbon monoxide into methane. As there is no reduction in the calorific value of the gas, there is no need to modify the composition of the gas to be treated. At the same time the carbon monoxide is completely removed. Careful removal of hydrogen sulfide before passage over the nickel catalyst has hitherto been regarded as essential, owing to the tendency of the nickel "poison." Dr. Gerdes states, however, that Dr. Bertelsmann has found a catalyst (of undisclosed composition) which is effective yet not affected by hydrogen sulfide. If this is confirmed, the intermediate cooling of the gas, removal of hydrogen sulfide and re-heating between the two stages of the process will become unnecessary and the cost of the process, which is at present its principal drawback, should be substantially reduced.

A major problem in the one-stage process was the development of a catalyst. This has been done by producing a highly active catalyst, which, at the relatively low temperature of 400 deg. C., accelerates the water gas reaction to such a degree that a reasonable reaction speed in relation to contact area is attained and thereby a contact vessel of suitable dimensions for practical working made possible. The catalyst, composed essentially of iron, with potash and other ingredients not disclosed by the inventors, is in powder form. It has a guaranteed efficiency for twelve months, and it has been in continuous use for some months without any very apparent deterioration. The one-stage process was decided upon for the gas plants at Hameln and Hamburg.

According to H. C. Gerdes (*Gas Times*, Feb. 23, 1935), the average composition, calorific value and density of the town gas at Hameln before and after the change to non-poisonous gas are as follows:

	Before change to non-poisonous gas	After change to non-poisonous gas
CO	21.4 per cent.	1.0 per cent.
H_2	53.8 "	63.3 "
CH_4	14.7 "	17.5 "
CHm	1.7 "	1.8 "
CO_2	2.9 "	13.3 "
O_2	0.6 "	0.2 "
N_2	5.0 "	2.9 "
kcal/m^3	4,300	4,200
Equivalent B.T.U. per cu. ft.	483	472
Density	0.46	0.46

Undesirable minor constituents of the gas are not inconsiderably reduced as is shown in the following table:

	Before change	After change
NH_3, g/100m^3	Unchanged	
HCn, g/100m^3	12.2	3.6
HCn, equivalent grains per 1,000 cu. ft.	53.29	15.73
$C_{10}H_8$	13.7	6.3
	(after dry purification)	
Organic S, g/100m^3	25	3.6
Organic S, equivalent grains per 1,000 cu. ft.	109.20	15.73
Benzol, g/m^3	Unchanged	

While the benzol content is unchanged, the characteristics of the benzoline are considerably improved owing to increased purity. The reduction of the calorific value by 100 kcals. was made in order to comply with the calorific power standard of the German Association of Gas and Water Engineers.

In addition to the actual detoxification, the process, as operated at Hameln, offers other advantages. The carbon disulfide (but not the thiophen) is completely removed from the gas. Organic sulfur is reduced, from 10.9 to 1.6 grains per 100 cu. ft., without the efficiency of the catalyst being affected. The benzene recovered with charcoal is of improved quality, being water-white and requiring no chemical refining. Gum-forming constituents are removed by the catalyst and the benzene is therefore stable. The contents of hydrogen cyanide and naphthalene are greatly reduced. At Hameln, the hydrogen cyanide was reduced from 5.0 to 1.6 grains per 100 cu. ft. and the naphthalene from 6.0 to 2.8 grains per 100 cu. ft. Finally, the catalyst is said to remove nitric oxide from the gas and so to prevent the deposition of gums in the distribution system. Higher oxides of nitrogen appear to be first formed, which are subsequently decomposed to oxygen and nitrogen.

For the cost of the process, Dr. Gerdes gives the following for Hameln. The cost of the gas in the year 1933-34 was approximately 3.9 pf./m^3 in holder, and its composition was 58 per cent. coal gas and 42 per cent. water gas. This cost was calculated as shown on the following table, which also gives the annual cost for non-poisonous gas, allowing for a 10 per cent. increase of volume (by production of hydrogen in the conversion plant) instead of the 13 per cent. actually obtained:

	Poisonous town gas		Non-poisonous town gas	
	RM	pf./m^3	RM	pf./m^3
Coal gas manufacture	180,463.23	5.64	190,600.00	5.96
Water gas manufacture	42,905.23	1.34	25,190.00	0.79
Gas handling	15,437.88	0.48	15,500.00	0.49
Coke preparation	4,502.53	0.14	4,900.00	0.15
Ammonia plant	7,122.40	0.22	7,820.00	0.25
General	12,431.93	0.39	12,500.00	0.39
Total		8.21		8.03
Deduct revenue from by-products		4.36		4.68
Cost of gas into holder		3.85		3.35

A margin of 0.5 pfennigs per cubic meter is apparently available to meet the cost of the new process without increasing the previous cost of the gas. The running costs of the process (0.22 pfennigs per cubic meter for current and 0.2 pfennigs per cubic meter for steam) are fully covered. Capital charges on the plant, which at present low rates amount to 0.125 pfennigs per cubic meter, are two-thirds covered, so that the balance of the capital charges and the proportion of the contact material, only to be calculated after the life of the catalyst has been definitely ascertained, still remain. This amount is about 0.08 pfennigs per cubic meter of gas.

Several economic results of this detoxification are of considerable interest. Not to alter the density and combustible properties of a city supply, the composition of the detoxified gas must be suitably modified, principally by reducing its content of water gas. This involves an increased production of straight coal gas, if the supply is to be maintained, even allowing for the slight increase in volume resulting from the detoxification process itself. The introduction of this process thus involves, among other things, a decreased production of water gas; increased production of straight coal gas; increased quantity of saleable coke; increased production of by-products.

At the Hameln plant, for example, it has been necessary to increase the amount of coal carbonized by 10 per cent., while the coke available for sale has increased by 30 per cent. At Stuttgart, it has been calculated that the extra coal is 18 per cent., and the additional coke for disposal 36 per cent. The economics of the process thus depend very largely upon the cost of coal and the selling price and possibility of disposing of increased quantities of coke and by-products. It is this greatly increased quantity of coke for disposal that presents the greatest difficulty to the majority of German gas plants. This, it would seem, is, or should be, a very minor difficulty.

Industry's Bookshelf

Money and Banking by Frederick A. Bradford, 814pp., Longmans, Green, $3.75.

Discusses the present Administration's monetary policies, the Thomas Inflation Amendment, the Gold Purchase Plan, the Silver Purchase Act of 1934, and other important and much-discussed New Deal monetary projects. The present volume is the second edition of the text, supplanting former two-volume edition.

Balancing the Economic Controls by Russell A. Stevenson and Roland S. Vaile, 96 pp., University of Minnesota Press, $1.50.

Summarizing a five-year research program, sponsored by the Economic Stabilization Research Institute, on the competitive position of Minnesota and the Northwest, prospects of future industrial development, and desirability of governmental control, the authors conclude that the price system is still the basic economic control, and that few remedies can be applied with slight disruption of our American institutions.

The Theory of Emulsions and Their Technical Treatment by William Clayton, 458 pp., Blakiston's, $8.

With emphasis on such industrial problems as flotation, lubrication, wetting phenomena, and detergency, this third edition presents the latest in fact and theory from an ever-broadening field. Recent development of borderline cases, such as theory of surface films, is not confused with the strictly liquid/liquid systems, which are this text's chief concern.

Petrology for Students by Alfred Harker (7 Ed.), 300 pp., Cambridge University Press, $3.

This short standard text, designed for students requiring only elementary acquaintance with petrology, serves as a guide to the study of rocks in thin slices.

Fluorescence Analysis in Ultra-Violet Light by J. A. Radley and Julius Grant, 326 pp., Van Nostrand, $7.

This re-written edition clarifies the original purpose of the authors who, in 1933, presented fluorescence analysis as an aid to practical analytical work. Consideration of the text reveals the necessity of strict standardization of working conditions, and the authors are to be congratulated on a "forward step" in analytical development.

Alcohol, Its Effect on Man by Haven Emerson, M.D., 144 pp., Appleton-Century, $1.

A clear summary of facts: the usual questions of the public are answered clearly and without prejudice. Dr. Emerson doubts that use of alcohol has modified the quality of human stock much through the ages, but he none-the-less shows its undesirable effects on chronic users. No moralizing, but the reader is better able to draw his own conclusions.

Economic Geography of Asia by Daniel R. Bergsmark, 618 pp., Prentice-Hall, $5.

Professor Bergsmark presents geography study as an aid to economic theory and practice, rather than the usual enumeration of facts so characteristic of texts in the last few decades. Much statistical material is original, throwing additional light on critical Asiatic problems.

Organizing and Financing Business by Joseph Howard Bonneville and Lloyd Ellis Dewey, 476 pp., Prentice-Hall, $5.

Problems of recent legislation and new business practices are the basis of a thorough revision of the text which is often studied in graduate courses. To facilitate study, the authors have italicized each financial term and phrase on its first appearance in the text.

Social-Economic Security by Constitutional Means by Hans Mayer-Daxlanden, 255 pp., Dorrance, $2.

Average America's ingrained distrust of sure-fire systems will probably react unfavorably toward this book. The author's program may be fundamentally sound, and his belief in American common sense and initiative is noteworthy, but we are all weary of being reminded that "the time has come for serious thinking."

Food and Beverage Analysis by Milton A. Bridges, 246 pp., Lea & Febiger, $3.

Up-to-date data and procedure for nutritive, mineral and vitamin values, and alcoholic analyses. Over 3200 analyses of nutritive values are included with practical facts on food preservation and dietetics.

The Structure and Properties of Matter by Herman T. Briscoe, 420 pp., McGraw-Hill, $3.75.

Might have been sub-titled a textbook of sub-atomic chemistry—an excellently clear exposition of the newer theories of matter from the chemist's point of view.

Feldspar as a Chemical Raw Material

By Donald E. Sharp and Aaron K. Lyle

McKinney feldspar mine near Spruce Pine, N. C. Photograph courtesy Consolidated Feldspar Corp.

COMMERCIALLY, it is sufficient to consider feldspar as a mineral consisting mainly of silica, and containing roughly 17 per cent. alumina and about 13 per cent. potash and soda, the actual alumina, potash and soda contents varying widely in spar from different localities. Two main varieties enter into the composition of commercial spars; namely, potash and soda spars. Most important among the potash spars are microcline and orthoclase, both $KAlSi_3O_8$, but differing in their mode of crystallization. Of the soda spars, albite is the chief, its composition being $NaAlSi_3O_8$. Potash and soda spars occur in intimate mixture in nature, so that commercial spar always contains both these alkalies, the spar being classified partly according to the preponderance of one oxide over the other. Most commercial feldspar comes from pegmatite dikes. Quartz and mica are almost invariably associated with it, and even different feldspars may occur in alternate layers of potash and potash-soda spars, with practically no quartz.

Feldspar is used as a more or less finely ground material. In the glass industry, it is ground to pass a 20 mesh screen while in the rest of the ceramic industries the spar is used at 100 mesh and finer.

The analyses shown in Table I are characteristic of feldspars used in the ceramic and glass industries.

Hardinge feldspar grinding unit. Photograph courtesy Golding-Keene Co.

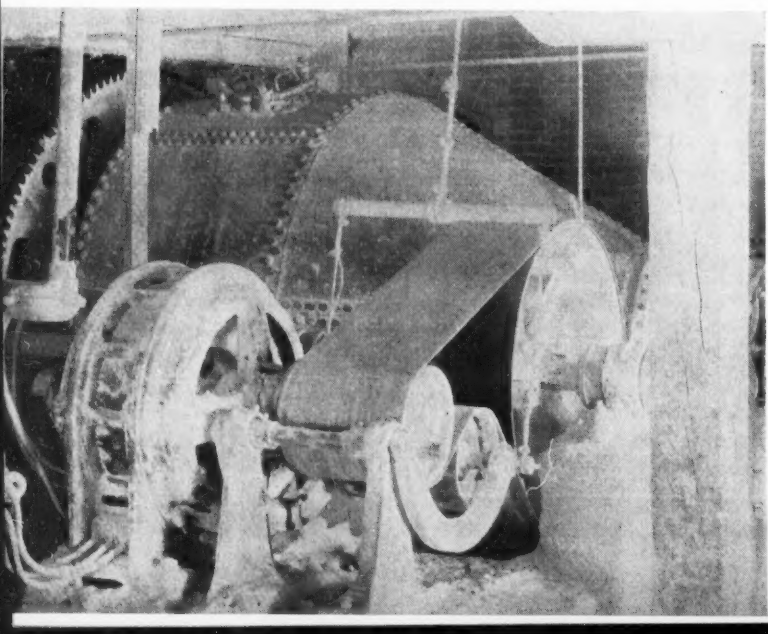


Table I

		Potash Spar	*Soda Spar*	*Typical No. 17 Glass Spar*
Silica	SiO_2	67.93	68.53	69.0
Alumina	Al_2O_3	18.20	19.59	17.4
Iron Oxide	Fe_2O_3	.07	.064	.08
Calcia	CaO	.20	.71	.1
Magnesia	MgO	nil	trace	nil
Soda	Na_2O	2.70	9.52	3.0
Potassium Oxide	K_2O	10.50	1.29	10.0
Ignition Loss		.40	.28	.4

Almost 90 per cent. of the feldspar consumed in the United States is used by the ceramic and glass industries, glass manufacture accounting for the largest single amount, although there is no real reason for dividing the ceramic industry into separate sections without also dividing the glass industry into its own divisions.

Due to the variability of production in the consuming industries, there is naturally much variation from year to year in the production and consumption of spar. The chart shown in Figure I indicates the total consumption of feldspar as well as the distribution among the glass, enamel, and pottery industries for the years 1927 to 1935. Recently, more than half the feldspar used by ceramic industries has gone into glass. Minor quantities are used in the production of scouring soaps, abrasives, binder for abrasive wheels, poultry grit, stucco and roofing, the amount for all these being about 10 per cent. of the total production.

Practically all feldspar sold is shipped in full car lots, either in paper lined cars or in bags. The principal markets are in the East, in the belt from New Jersey westward through Ohio to the Mississippi River. While there is considerable variation in consumption, the average annual consumption of ground spar in recent years has seldom been below 130,000 tons and seldom above 225,000 tons, the average being about 160,000 tons valued at about $2,000,000.00 per year.

Importations of feldspar are almost entirely of the crude material. Indeed, statistics of the Bureau of Mines[1] show that less than 30 tons of ground feldspar were imported in either 1932 or 1933. However, almost 1900 long tons of crude spar were imported in 1932

and over 3200 tons in 1933, although during the latter year about 6600 tons of Canadian spar, or about five per cent. of the total, were ground in the mills in the United States. Prior to about 1929, fully ten times as much spar was imported annually.

Feldspar production of the five major producing countries from 1929 to 1932, as taken from the Bureau of Mines statistics[1] is shown in Figure II and it is to be noted that the United States is by all odds the greatest producer.

The statistics of feldspar production must always be considered in relation to the price trend. Thus, crude feldspar may be produced in great volume in some years, in anticipation of price advance, although consumption of ground spar may be relatively low. Conversely, there are years when the crude stock is drawn upon heavily and when shipments of milled spar actually exceed the amount of crude produced. As a rule, the carry-over is fairly large because of the variation in composition of crude and the varied requirements of the users. The trends in production of crude spar are shown graphically in Figure 3 along with data on the value of the crude, for the period from 1915 to 1934.

Prices of ground feldspar have varied considerably over a period of years from a low of about $8.00 per ton to a high of about $20.00 per ton. Part of this price spread is due to the normal variation in the prices of spars to different industries based upon the difference in grades and in grinding requirements. The following schedule of prices is typical of these variations:

Glass Spar	$11.50 per ton F.O.B. shipping point
Enamel Spar	14.50 per ton F.O.B. shipping point
White Ware Spar	16.50 per ton F.O.B. shipping point

For glass, a coarsely ground product is usually used. If the glass manufacturer used a 200 mesh spar he would pay about the same price as the maker of white ware. An excess of productive capacity in the feldspar industry leads to low prices in poor times and to somewhat abrupt increases as the demand improves.

Although used in opal glass for many years, feldspar was not employed in the glass industry in substantial volume until its adoption by the bottle industry (about the time of the World War) as a means of increasing the chemical durability and resistance to devitrification. It has since come into fairly general use in all types of glass, including window glass and table ware as well as bottles. For glass making, it makes relatively little difference whether the spar is preponderantly a potash spar or a soda spar, since it is introduced only for its alumina content. However, the potash spars are favored because of their higher alkali content. The iron oxide content of glass spar is usually below 0.1 per cent.

For the best chemical durability of a glass, the amount of alumina introduced as feldspar has been found to be from 1.5 to 2.5 per cent. of the glass, depending upon type. A recent investigation of Lyle, Horak and Sharp has demonstrated that sand-soda-lime glasses can have their resistance to chemical attack increased 50 per cent. by the substitution of alumina for lime or silica to the extent of one-eighth the alkali content of the glass. A typical bottle glass composition and batch formula are given in Table II.

Table II

	Per cent.		*Pounds*
Silica	73.5	Sand	1000
Alumina	2.0	Soda ash	420
Calcia	7.0	Limestone	190
Soda	17.5	Feldspar	175

For white ware, the potash content is generally required to be at least double the soda content, and the spar must fire to a good white color. Practically all of the Canadian spar is consumed by the white-ware industry. Such a spar with a relatively high potash-soda ratio is classed as a "high-grade" spar, in contradistinc-

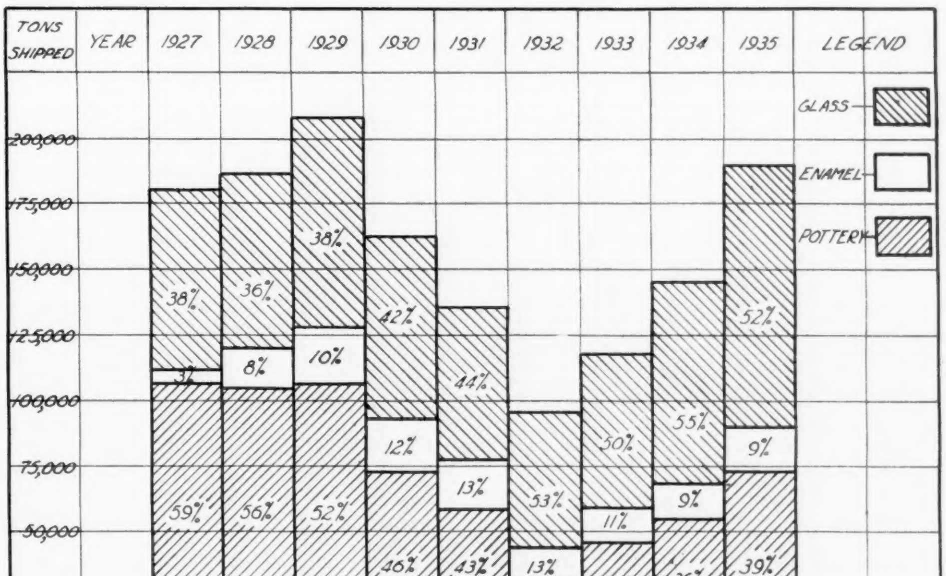


Figure 1. Chart showing total yearly shipments of feldspar from 1927 to 1936 by classification.

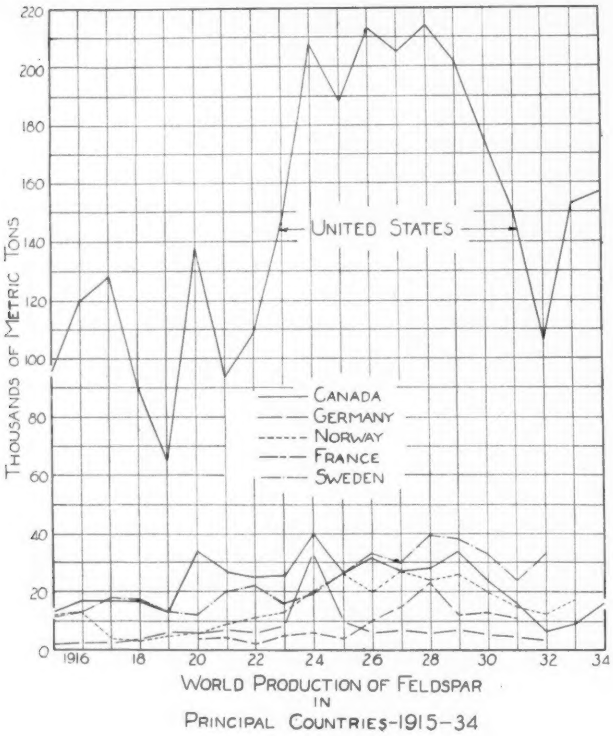


Figure 2.

tion to spars of lower potash-soda ratio which are classed as "low grade". In other words, the designation of "high" or "low" has no reference to quality, but simply refers to the ratio of potash to soda.

High tension electrical porcelain requires a very high ratio of potash to soda, as well as a low content of free quartz and iron. On the other hand, for ordinary cheap insulators almost any feldspar that is low in price is generally used and there is no specification of quality.

Sanitary ware and floor tile manufacture also call for a high-grade spar. Since the amount used may be as high as 50 or 55 per cent. of the total constituents of the body, specifications are rather strict, both as to potash-soda ratio, and for content of lime and iron. A good color when fired is an important consideration in selecting a spar for tile or sanitary ware.

The feldspars used in glazes are relatively quite the highest in soda, although there is much variation in what is demanded by different users. As a rule, the potash content is about the same as the soda content, or just a little higher. Low potash spars are used in many enamels, although there also are enamels requiring high grade spar, in which the user demands good uniformity, particularly in the silica content. A somewhat coarser grind of spar is used in glazes and enamels, than in sanitary ware and floor tile. Crandall[2] has pointed out that garnet, hornblende, tourmaline and biotite mica do not go into solution but maintain their identity throughout the firing treatment, and hence the enameler must select a feldspar free from these impurities to avoid the black and brown spots they cause on the surface of the enamel.

In Table III are given several batches, used in the preparation of ceramic bodies and enamels, which show the use of feldspar in the various types of ceramic wares.

Table III

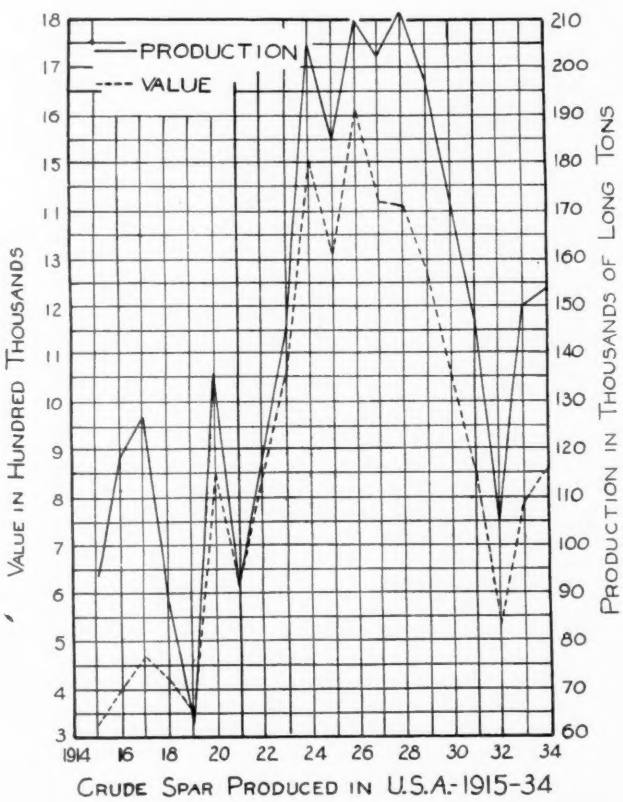
Typical ceramic mixture using feldspar

	Vitreous China	*Electrical Porcelain*	*Floor Tile*	*Sanitary Ware*	*Sheet Iron Enamel*
Feldspar	35	30	45	26	28
Flint	35	23	52.0	33	20
Clay	30	45	30.0	45	10
Magnesium Carbonate			1.5		
Whiting		2			
Manganese Dioxide					0.4
Cobalt					0.3
Soda ash					9
Nitre					4
Borax					32
Fluorspar					7

Summarizing, the glass manufacturer is interested mainly in the alumina content of the spar, the white ware manufacturer in its content of fluxes, and the enameler in the constancy of silica and its freedom from impurities that will float to the surface and cause spots. All would like material that is low in iron content, although this consideration may often be partially waived if the iron is not unduly high.

There has been much change over a period of years in the localities from which feldspar has been taken. In 1907, about 18,000 tons or over 21 per cent. of the total U. S. production came from Pennsylvania, while none was produced in either North Carolina or New Hampshire. In 1929, the production in Pennsylvania had dropped to less than 2000 tons while North Carolina had stepped up to over 100,000 tons or over 50 per cent.

Figure 3.



of the total, with New Hampshire producing 30,000 tons or about 15 per cent. By 1933, Pennsylvania had dropped to a fraction of a per cent., while North Carolina still maintained well over half the total; Virginia, the New England states, South Dakota, Colorado and Arizona producing a good share of the remainder.

A substantial amount of feldspar is imported from Canada each year, practically all as crude, to be ground in New York and Ohio. Canada has large feldspar deposits, but many run too high in iron to permit their use in the ceramic industry, while others that are suitable are not located near enough to transportation facilities to make them available economically.

The actual mining of feldspar is carried out principally by quarrying methods, although a great bulk is produced by underground mining operations. A considerable quantity of spar is produced by "farmer" miners who quarry the material on their own properties and cart it to the grinding mill. In larger operations from pegmatite dikes, the overburden is first removed by means of hand shovels, scrapers and other means, and the rock is loosened by drilling and blasting. The broken rock is handled by means of forks and loaded into carts, cable-way buckets or cars, according to the transportation facilities available, for transmission to the mill. At some mines, crushers and picking belts have been installed for immediate selection of the material in order to eliminate the transportation of waste rock which often reaches to as high as 75 per cent. of the total mined.

In general, the large lumps of spar are stored in their crude state in piles or rough bins according to source, or to the variety as judged by the operators. From these, the material is passed to a primary crusher from which it emerges in lumps of about two inch size. These are passed along a picking belt where inspectors sort the material, by grading it by appearance, color and by physical characteristics into No. 1 potash spar, No. 2 potash spar, No. 1 soda spar, No. 2 soda spar, flint, and waste. Inspectors become very skillful, through the guidance of chemical analyses on carefully graded material, and are able to select very accurately by appearance.

The roughly classified material is again stored in piles or bins from which it ultimately travels to a secondary crusher which reduces it to a half-inch size preliminary to the drying that precedes milling in the ball mills. Blending may precede the milling, or may take place during the milling as a continuous process. Either screens or air separators are finally used to grade the material for fineness, and any that is too coarse is returned for remilling.

In 1920 Watts[3] presented to the American Ceramic Society a proposed specification for commercial feldspar and flint, covering sampling, chemical composition, physical properties and tests, which served as a basis for the classification and standardization of spars which has been achieved in recent years. These specifications were directed toward general ceramic ware manufacture, and a few years later the American Ceramic Society published tentative specifications[4] for feldspar for the manufacture of white ware, drawn up by a committee and based on Watts' earlier specifications, and on the needs of the producers and consumers. According to these specifications, the spars were classified into four groups as in Table IV.

Table IV. Classification of Feldspars

Grade	*% K_2O*	*% Na_2O*	*% CaO-MgO*	*Fusion*
A	above 10	below 3.6	not over 0.75	with or before cone 9
B	above 9	below 3.2	not over 1.00	with or before cone 8
C	above 7.8	below 2.8	not over 1.00	between cones 7 & 8
D	not over 3.	not below 7.0	not over 1.00	with or before cone 7

More recently, under the guidance of the Bureau of Standards, and with the cooperation of the Feldspar Grinders Institute, producers, consumers and others, commercial standards of quality were set up[5] which are now in general use. These specifications cover ground feldspar used in the production of ceramic products, on the basis of particle size and chemical composition. While intended for classification rather than specification of feldspar, nevertheless they have come into use as purchase specifications. Complete details were given of standard methods of making physical tests, as well as the complete procedure for accurate chemical analysis of the material. The details of test procedure would be out of place here, but the physical and chemical classifications are important, and therefore are reproduced in full in the following:

Commercial Standard CS23-30

I. Scope

This commercial standard classification covers ground feldspar used in the production of ceramic products, based on particle size and chemical composition. It is to be regarded as a classification rather than a definite purchase specification.

II. General Requirements

All screen tests shall be made on standard screens (U. S. standard sieve series), the opening sizes of which are appended in Table 1. Standard methods of screen testing and chemical analysis are described on page 4.

III. Detail Requirements

A. PHYSICAL CLASSIFICATION BASED ON FINENESS OF GRINDINGS*

Table 1

United States standard sieve series No.	*Percentage remaining on No. 200 sieve*	*Maximum percentage on sieve designated*	*United States standard sieve series (opening in inches)*
230	0.00– 0.35	1.0	0.0024
200	0.35– 1.00	1.0	.0029
170	1.00– 2.50	1.0	.0035
140	2.50– 5.00	1.0	.0041
120	5.00– 9.00	1.0	.0049
100	9.00–14.00	1.0	.0059
80	14.00–21.00	1.0	.0070
60	21.00–30.00	0.6	.0098
40	30.00–42.00	0.3	.0165
20	42.00–62.00	None	.0331

* Fineness classification shall be made on a basis of the percentage remaining on the standard 200 sieve and that remaining on the sieve designated. Example: 140-sieve product will have 2.5 to 5.0 per cent. remaining on the 200 sieve and less than 1 per cent. on the 140 sieve.

B. CHEMICAL CLASSIFICATION BASED ON COMPOSITION AS IT INFLUENCES USE

The numbers designated herein are for the purpose of illustration and the various groups may be added to, up or down the scale, to provide for all commercial grades of feldspar.

Group 1

The first group includes the commonly accepted ceramic or body grades based on silica content and alkali ratio and containing less than 4 per cent. soda (Na_2O) content.

The silica number and ratio numbers are to be used in combination. For example: Grade No. 67-51 designates a spar of silica content 66.00 up to 67.99 per cent. and with 5 or more parts of potash (K_2O) to 1 part of soda (Na_2O).

Number	*Silica (SiO_2) content in per cent.*
65	64.00–65.99
67	66.00–67.99
69	68.00–69.99
71	70.00–71.99
73	72.00–73.99
	Potash (K_2O)-soda (Na_2O) ratio
61	6 or more potash to 1 soda.
51	5 potash to 1 soda up to 6 potash to 1 soda.
41	More than 3 and less than 5 potash to 1 soda.
31	3 or less potash to 1 soda.

Group 2

The second group includes the spars used chiefly for glazing purposes which are based on soda content and contain 4 per cent. or more soda (Na_2O).

Number	*Soda (Na_2O) content in per cent.*
4	4.00–4.99
5	5.00–5.99
6	6.00–6.99
7	7.00–7.99
8	8.00–8.99

Group 3

The third group includes the spars used for glass-making purposes and are based on silica, alumina, and iron content.

The numbers are to be used in combination: For example, grade 69—17—X represents a grade of spar of 68.00 to 69.99 per cent. silica, 17.00 to 17.99 per cent. alumina, and with a maximum of 0.15 per cent. Fe_2O_3 content.

Number	*Silica (SiO_2) content in per cent.*
65	64.00–65.99
67	66.00–67.99
69	68.00–69.99
71	70.00–71.99
	Alumina (Al_2O_3) content in per cent.
15	15.00–15.99
16	16.00–16.99
17	17.00–17.99
18	18.00–18.99
19	19.00–19.99
	Iron (Fe_2O_3) content in per cent.
X	A maximum of 0.15
XX	A maximum of 0.20
XXX	Above 0.20

In the glass industry, the chief competitor of feldspar is alumina hydrate, which, however, is much more costly per unit of alumina. To produce 1000 pounds of alumina in glass requires about 5890 pounds of an average feldspar costing $13.00 per ton. The entire cost would therefore be about $38.29 against which is a credit of $8.24 for about 4120 pounds of sand at $4.00 per ton, which would not be required because of the silica in the feldspar. There would be an additional credit of about $13.10 for 1310 pounds of soda ash also not required because of the approximately 766 pounds of soda and potash introduced in the spar. The net cost of the 100 pounds of alumina would consequently be about $16.95 or a little over 1½ cents per pound. About 1530 pounds of alumina hydrate are required to produce 100 pounds of alumina, costing at 3 cents per pound, $45.90, or over 4½ cents per pound of alumina.

Competition by alumina hydrate is therefore minor and confined entirely to very high grade glasses in which an extremely low iron content is required. Moreover, it is reasonably well established that feldspar goes into solution in glass more readily than alumina hydrate, kaolin, or similar sources of alumina.

The direct competition for feldspar in the white ware industry comes from Cornwall stone, sometimes called china stone. This is a kaolinized feldspar containing a considerable quantity of quartz along with smaller amounts of mica, fluorspar, topaz, and tourmaline. As indicated by the name, Cornwall stone is imported from England where for many years it has found extensive use in the pottery industry. As many American customs and practices of the industry have been inherited from England its extensive use was quite logical. However, with the large deposits of feldspar available here and with the steady advance of new methods based upon sound technology, the use of Cornwall stone has decidedly diminished. In 1929, the total imports of crude and ground Cornwall stone amounted to 7575 long tons. Since then, the amount has decreased until in 1933 the total was only 763 long tons, a decrease of nearly 90 per cent. Part of the decline may be attributed to the general business depression, but since feldspar production decreased only 50 per cent. over this same period, there is reason to believe that domestic feldspar has been permanently supplanting Cornwall stone during the past few years.

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[2] Journal Am. Ceramic Society 13, 530-31 (1930).
[3] Arthur Watts, J. Am. Ceram. Soc. 3, 722-9 (1920).
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Lime Sales 1935

Sales of lime in '35 by U. S. producers amounted to 2,955,000 short tons valued at $21,438,000, according to preliminary figures furnished by lime manufacturers. This was an increase of 23 per cent. in quantity and 25 per cent. in value compared with sales of 2,397,087 tons valued at $17,164,024 in '34. Average value per ton in '35 was $7.25; in '34 it was $7.16. The total sales of lime in '35 included 990,000 tons of hydrated lime valued at $7,764,000, an increase of 19 per cent. in quantity and 23 per cent. in value compared with '34 (829,430 tons valued at $6,324,623). Average value per ton of hydrated lime in '35 was $7.84; in '34 it was $7.63.

Wax Pastes and Mixtures

The Physical Chemistry of these Systems

By Charles F. Mason, Ph.D

DATA upon the physical chemistry of waxes are meagre and hard to obtain. Since 1907, nine hundred and sixteen patents have been granted here and abroad, eight hundred and sixty-five scientific reports have been published in the journals, and fifty-eight books have been printed (twenty-three in German, two in French, and thirty-three in English), but the facts necessary for scientifically formulating a new wax mixture or paste to meet certain requirements, are not on record.

Waxes suspended or partially dissolved in volatile solvents have been sold for about twenty-five years and used for polishes for shoes, floors, furniture, and automotive vehicles. Recently, as a result of the use of synthetic waxes and empirical experimenting, semi-pastes have appeared which contain as low as eight per cent. solids and being of gelatinous consistency show no signs of settling. They are easy to apply and should become popular in this age when labor-saving is considered progress. These semi-pastes mark the only notable progress in a field obscured by so-called secret processes, fantastic trade names, and formulas with few well directed scientific investigations.

When one considers the eight natural waxes of different grades which total eighteen, five types of paraffin, and at least fifty different synthetic waxes, it appears that more scientific data or melting point composition curves, solubility temperature diagrams, solvent retention, viscosity composition, and even a scientific method of measuring gloss would be of great service in choosing both a wax mixture and solvent. An industry which has fifty million dollars in sales per year can benefit by orderly scientific methods. Wax mixtures and pastes must be formulated to meet specifications of cost, melting point, viscosity of the resulting solution, spreading power, film, etc.

A typical set of such specifications is outlined below. Those products that meet these requirements have usually done so by trial and error batches and the laboratory of the purchaser has done the testing gratis.

	Paste		Semi Paste
Solids Melting Point	71°C.	Minimum	Ditto
" Acid No.	8	Maximum	"
" Sap. No.	20–70		"
" Ash	0.5	"	"
Solvent Flash Pt.	27.5°C.	Minimum	"
Solids	20%	"	11% Minimum
Drying Time	20 Minutes		20 Minutes

Additional requirements are easy spreading, no sweating or separation of the solvent, no hard or soft lumps of any kind but a smooth cream, no settling of the solids in the semi paste, lasting gloss, definite covering power, a transparent continuous film when rubbed upon glass and observed with the naked eye, and last a dye of such a nature and in such a quantity that when applied to new unstained or unvarnished wood the latter will not be discolored. All these specifications have never been met but have been approximated and the bidder's product which approaches in quality and price most closely is accepted.

In no other field has there been more empirical experimenting than in waxes and it continues even by the largest users. The candle makers, after establishing by trial and error the composition for a candle of definite melting point, tensile strength, etc., often keep no permanent record of results for future reference because of the mistaken notion that the properties of paraffin, stearic acid, natural and synthetic waxes vary too widely between separate shipments. Thus, the same road of empirical experimenting is being trodden repeatedly.

Even sellers of natural waxes and especially large chemical companies which produce synthetic ones are at fault in that they list only the melting point, acid number, color, price, some possible uses, and a few sentences about how to emulsify or its superior properties. Empirical formulas for wax products are numerous and free to any one who wishes to visit a public library or write to Washington, D. C., for a booklet, but even a wax specialist cannot appraise such formulas and predict with accuracy the behavior of the deposited film under varying conditions of vibration, wear, or weathering. Neither can he predict the consistency of the finished product nor its behavior in and out of season in cans shipped to the tropics or the Arctic circle.

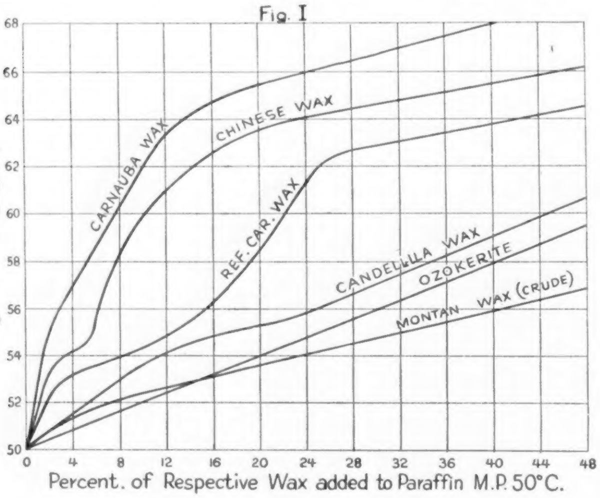
In such formulas the relative weights of the waxes and solvents are listed with instructions to heat together and pour into cans; care being taken to avoid disturbance until the contents have cooled and solidified. Direct or steam heat is not specified and the temperature of the solution or the instructions about agitating during cooling are ignored as though they were of no significance. The significance of these points will be emphasized later. Plainly, there are any number of combinations of waxes and solvents from which satisfactory polishes can be made, and no two on the market are identical except in cases where discharged employees of wax producers have gone into business for themselves or induced their new employers to adopt such products.

A deeper insight into the methods of preparing these products and their properties comes by knowing physico chemical data, and the purpose of the present report is to submit the meagre data available and interpret it toward a wiser choice of materials, plant equipment, and method of preparation.

Manufacturers who desire to produce and sell such products usually buy samples of all competing ones and after obtaining the consensus of opinion relative to

which is the best, submit it to a chemist for analysis and duplication. All the chemist can do is to determine the per cent. of total solids, melting point, saponification number, acid number, iodine number, and the nature of the solvent. From the wax constants he can conclude quite accurately the per cent. of animal, vegetable, and mineral waxes present but to tell what and how much of each type is largely guess work. However, he makes a small quantity of wax mixture under conditions which duplicate the plant equipment available and with the best small scale devices at his disposal, and even though this batch is superior to the one submitted for duplication, it is rejected because hardness, ease of application, brilliancy of gloss and other properties can be measured only by the opinions of practical men. The chemist then makes at least six batches under varying conditions and with various combinations of solvents and waxes which lie within the price range. One is finally adopted for sale; usually the poorest one for reasons mentioned above.

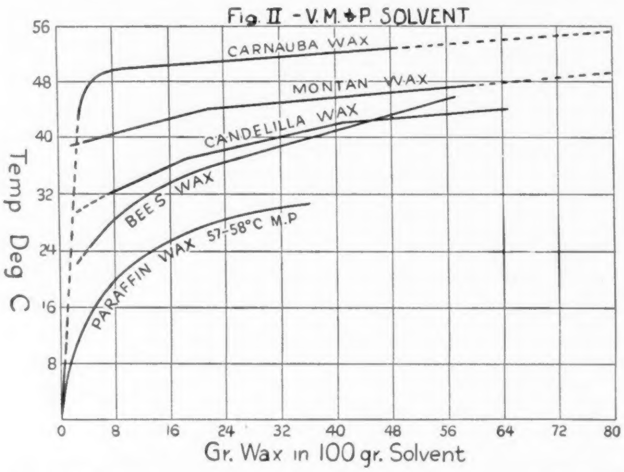
The Germans have been far ahead in wax researches. The work of Carl Ludecke (*Schuhcremes und Bohner Massen*, 1912; also *Seifenseider Zeitung*, Vol. 47, year 1920) is plotted in Figure 1, the only published data available upon melting point composition relations of natural waxes and paraffin. The popularity of carnauba and Chinese waxes (aside from other desirable properties) is justified by high melting points ob-



tained up to eighty parts of paraffin and twenty of wax. With higher ratios the melting point drops rapidly. The peculiar behavior of refined carnauba wax can be attributed to the paraffin invariably present and the sodium salts of fatty acids and higher alcohols which are hard to remove completely.

The behavior of candelilla, ozokerite and crude montan blended with paraffin suggests that these materials contain large amounts of long chain hydrocarbons which, being similar in type to paraffin, dissolve mutually in a manner which approximates the laws of ideal solutions. The presence of no eutectic mixtures in this range shows how futile the past attempts have been to compound waxes in volatile solvents which after spreading would dry bright without rubbing. A eutectic mixture, deposited from a solvent in a continuous film without crystals or amorphous particles which would reflect the light at one angle, would be the answer. The usefulness of this diagram is obvious and more of a similar nature are badly needed.

The solubility values are those of O. A. Pickett (*Ind. Eng. Chem* 21, 767, 1929), and are plotted in Figures 2, 3 and 4. Comparison of these curves (all on the same scale) show that generally higher temperatures are required for turpentine and turpentine-gasoline to dissolve the same quantity of any wax than are required for V. M. & P. Naphtha. Moreover, the differences in slopes of the curves for solvents used in Figures 3 and 4 compared to those of Figure 1 indicate that turpentine has a selective solubility at each temperature for some component of the wax and that when such a wax solution is allowed to cool slowly it will



deposit each component separately instead of the wax itself as a crystal aggregate. Such wax pastes will be smoother than those made with V. M. & P. Naphtha alone.

This deduction is in harmony with observations. Although turpentine is being displaced by petroleum distillates, on account of cost, its continued use is recommended. Moreover, when the wide temperature intervals, corresponding to the same amount of any wax in solution are compared, for Figures 3 and 4 to those of Fig. 2, it is at once apparent that upon slow cooling from 100° C. to room temperature, 18° C., the deposited crystals, crystal aggregates, and amorphous particles have more time to adjust themselves and grow slowly to a wax skeleton or colloidal cream which is one way of picturing the little known inner structure of these products.

Unfortunately, the solubility curves of paraffin in solvents of Figures 3 and 4 are not available but one is for that of Figure 2 and will be discussed for one commercial wax which consists of forty paraffin and ten carnauba in one hundred of V. M. & P. Naphtha. As this solution cools from 100° C. to 18° C. no turbidity will appear until 49° C. is reached, and carnauba wax only will deposit until 32° C. during which eight parts will be separated from solution. At this temperature paraffin will begin to deposit and will continue

simultaneously with carnauba until it has attained equilibrium relative to heat transfer with the surroundings. At this point six paraffin and one-half carnauba will remain in true solution which agrees closely with experiment. Therefore, the effect of the solubility of one wax upon that of the other when dissolved in the same solvent is very small.

If this solution is poured into cans immediately after heating to 100° C. in a steam kettle and is allowed to cool through this temperature interval without stirring, the deposited carnauba wax will have time to settle to the bottom of the can before the paraffin will deposit and raise the viscosity of the solution to a point which will retard this action. Such a product will have a higher concentration of carnauba wax near the bottom than near the top. Thus, the hardness will vary in the same ratio. Apparently this is a common defect in wax pastes and is noticed by porters and chauffeurs, who, eager to produce a good lustre, invariably work directly toward the bottom of the can and ignore the concentric ring of wax which lies under the rim of a pressure top container.

Fig. III - TURPENTINE

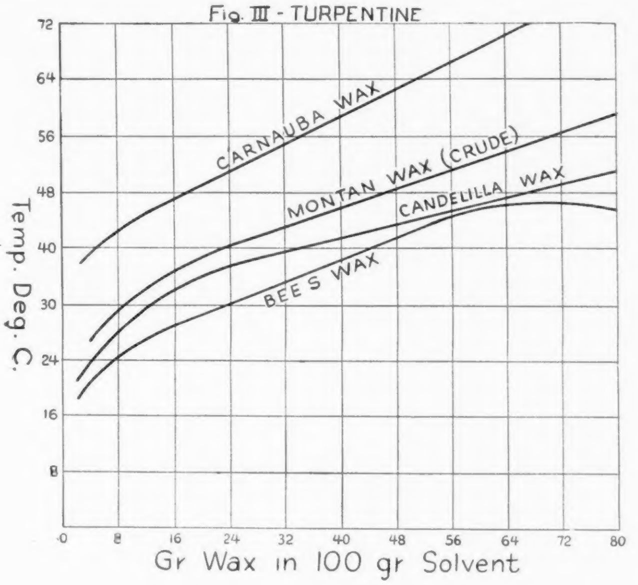


Table 1

Crystallization Points of 10% wax solutions from respective solvents. (Synthetic Waxes.)

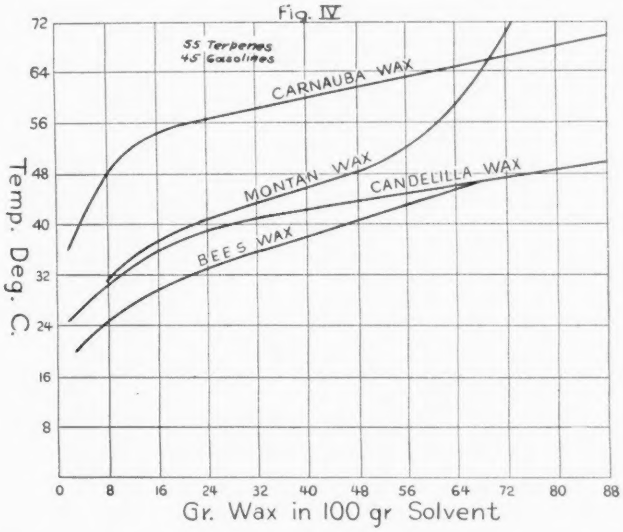
Wax	*Amer. Turpentine*	*Heavy Benzine*
Rilan	58-59° C.	68-69° C.
I. G. Wax Z.	66-67 "	66-67 "
I. G. Wax C. R.	45-46 "	48-49 "
I. G. Wax B. J.	43-44 "	69-70 "
I. G. Wax S.	47-48 "	55-56 "
I. G. Wax E.	54-55 "	59-60 "
Shellac Wax	38-39 "	42-43 "

Comparing these values to those in Figs. 2, 3 and 4 for 10% concentrations, Rilan, I. G. wax E. and Z. are superior to carnauba in respect to temperature of solution, and although they come out of solution at a higher temperature than carnauba, they do so in a finely divided colloidal or gelatinous condition which does not subside and in addition retards the settling of other natural waxes present. This is beneficial in making wax gels of low concentration. Data of Dr. G. Baerlocker, Berlin.

Since carnauba wax is the last to go into solution with rise in temperature and accordingly the first to come out from any of the three solvents, the resulting product, if stirred during cooling or until deposition of waxes starts, will consist of carnauba particles surrounded by layers of any other natural waxes present in the order of decreasing solubility (curves of Figures 2, 3 and 4) which places paraffin last in this order. When such a paste is spread the natural lustre imparting harder waxes will be lubricated by the paraffin, which should result in little friction and uniform distribution in the film. See Table 1.

The data upon drying qualities as a function of the solvent and the waxes chosen are those of L. Ivanovszky (*Allgemeine Oel und Fett Zeitung*, 29, 598, 1932), and are shown in Figure 5. He made 25 per cent. solutions of individual waxes in benzine (boiling point 150-195° C.) and after allowing them to cool and age he exposed weighed quantities in cylindrical glass dishes to the atmosphere at 15-18° C. and constant humidity and measured by weighing at regular intervals the loss of solvent. The loss in weight of 100 grams of the 25 per cent. solution under identical conditions was termed the retention number Rz from which he calculated the retention R. by $R = \frac{100}{Rz}$. Naturally, the retention number can vary between the limits 0 to 75 and the retention between 1.33 to 100.

Fig. IV



Unfortunately, he did not record the thickness of the exposed portion of wax and the changes in physical condition as the solvent was evolved. Moreover, some misprints and omission of a data sheet make it necessary to introduce a few modifications and submit only the curves and some data which are of different systems. In an earlier report he submitted the list of waxes which have been arranged in a series of decreasing retention for the solvent benzine (B. P. 150-195° C.) in 25 per cent. solutions but the degree of each is omitted. See next page for list.

Referring to Figure 5, curves 1-2-3-4 which represent various combinations of two paraffins with beeswax

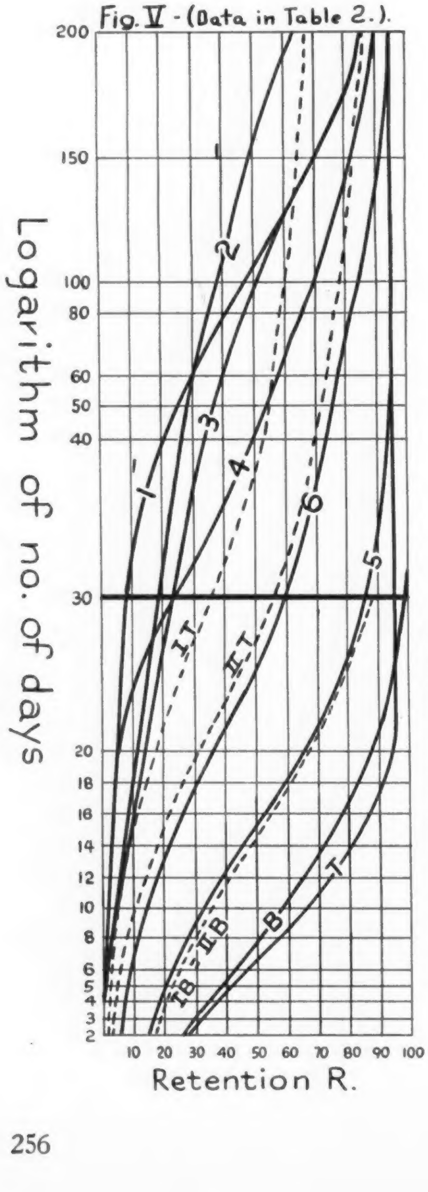
List of Waxes Mentioned on Page 255

Crude Montan Wax
Japan Wax
Carnauba Wax
Bees Wax
Refined Ozokerite
Extracted Paraffin
Hard Paraffin
Normal Paraffin
Bleached Montan Wax
Ozokerite-Ceresin Mixture equal parts
Soft Ceresin
Hard Ceresin

are ideal for goods which must remain fresh upon dealers' shelves for long periods. Curves 5 and 6 represent beeswax and paraffin, M. P. 57° C., respectively. Paraffin alone retains the solvent better than beeswax alone in the same solvent, but both are inferior to the combinations of curves 1-2-3-4. Curves B and T represent respectively the behavior of benzine and turpentine under conditions identical with those of the wax pastes. The curve 1B = 11B represents two which are identical and are paraffin and refined ozokerite in benzine. The curves 1T, 11T represent this paraffin and refined ozokerite when dissolved in turpentine and benzine; this shows the decided effect of changing the solvent.

These curves will convince the experienced worker that a wax film retains the solvent even after buffing and the instructions upon the cans of such goods: "Spread and polish immediately or allow to dry twenty minutes and then buff," are far from the truth. One label has instructions to recoat only after at least 24 hours. When a film of wax paste is spread upon a glass plate and allowed to dry the odor of the solvent is noticeable for many days (2) and the deposited wax draws up into circular formations, a phenomenon which is described as cracking. This is surface tension and no measurements have ever been made upon it with such products. Naturally, the film while still soft can be buffed and the ridges can be smoothed out but the layer of wax is not uniform in thickness; and with the progressive evaporation of the solvent the gloss is affected.

These products are too useful today to allow their behavior and formulation to remain upon an entirely rule of thumb basis and it is hoped that scientists will give them more attention.



Data for this chart given in Table 2, opposite. Curves 1, 2, 3, 4 represent combinations of two paraffins with beeswax, and curves 5 and 6 represent beeswax and paraffin, M. P. 57°, respectively.

Table 2

This refers to Figure 5.

	Paraffin M. P. 53° C.	57° C.	*Beeswax*	*Room Temp.* 15-18° C.	*Dishes* 0.5 in. diam.
1	50%		50%		
2		90%	10%		
3	90%		10%		
4		50%	50%		
5			100%		
6		100%			
B	Heavy Benzine				
T	Turpentine				
1B	Paraffin Benzine Paste				
11B	Ozokerite Benzine Paste				
1T	Paraffin Turpentine Paste				
11T	Ozokerite Turpentine Paste				

Table 3

Various, two-component wax blends dissolved in benzine (25% waxes) and the percentage loss of the solvent was measured after thirty days' exposure to the atmosphere under conditions identical with those in Table 1.

Paraffin / **Component**	**100** / **0**	**99.5** / **0.5**	**98** / **2**	**95** / **5**	**90** / **10**	**80** / **20**	**50** / **50**	**25** / **75**	**0** / **100**
Paraffin M. P. 48 and 61°C. ..	34	..	35	..	40	..	50	..	66
Par. 53°C. Ozokerite 77	58	36	25	31	33	35	63	74	79
Par. 53°C. Ozokerite 79	58	..	..	..	20	30	..	..	83
Par. 61°C. Ozokerite 79	66	..	..	..	75	77	..	..	83
Par. 53°C. Bees Wax	58	..	..	..	25	..	10	..	88
Par. 61°C. Bees Wax	66	..	..	..	79	26	..	..	88
Par. 48°C. Montan A.	34	..	..	..	50	..	38	..	49
Par. 61°C. Montan Wax	66	..	..	..	64	..	54	..	48
Par. 61°C. Carnauba Wax ...	58	..	46	..	..	..	50	..	87

The upper horizontal column contains the percentage of paraffin and the percentage of the component; and under each the figures, opposite the names of the ingredients, represent the percentage of benzine lost by exposure after 30 days. Some values are very striking, for instance, the low one twenty corresponding to 90 per cent. paraffin and 10 per cent. ozokerite, also twenty-six corresponding to 80 per cent. paraffin and 20 per cent. beeswax. These experiments cannot be considered analogous to the behavior in a film, but they are indicative of how certain mixtures retain the solvent tenaciously.

Dextrin Manufacturing Methods

By J. A. Radley

MANUFACTURING processes for dextrin fall into two broad classes: those in which the dry starch is heated alone, or with acid or acidic substances, and those in which a suspension of starch or a starch paste is treated with chemical agents or with enzymes. The first type of process yields dry-powder products varying in color from white through yellow to dark brown, while the processes of the second type give liquid products which are dried to coarse powders or pearl-shaped granules.

Dextrins of commerce may be slightly soluble, or completely soluble in water, and white or dark colored. The aqueous solutions may be viscous or limpid, clear or cloudy, and sticky or non-adhesive, according to the type of dextrin made, by varying the method of manufacture. The products are generally marketed under the names of white or yellow dextrin. The names, apart from giving an indication of the color of the product, are meaningless. Every user has his own special requirements for dextrin, and the manufacturer who supplies him knows these requirements and is able to give him the correct grade. One manufacturer claims to be able to supply over 400 different yellow dextrins of varying properties.

A more definite classification has long been wanted, and the writer has found that if the starch from which the dextrin is made is specified, followed by the viscosity of a 1—1 solution of the dextrin in water at 50° C., as compared with water, a better and more exact description is obtained. Thus, a yellow potato dextrin of good solubility, sugar content of 2.5 per cent., moisture content of 11 per cent., which yields a fairly adhesive solution, under this classification would be: Yellow potato dextrin, 57. In the determination of the viscosity of dextrin, allowance should be made for the amount of moisture in the product. This system worked quite well in a factory run by the writer, but it is by no means claimed to be the best possible.

Maize, potato, arrowroot, and tapioca starches are the most widely employed, and the tubers of the last three starches after drying and grinding may be used, but a much greater amount of catalyst is required for conversion. A longer time and higher temperature are also necessary when working from tubers, and the dextrin so made has to be separated from the cellular material by a process of solution.

Most Widely Used Starches

Maize starch is widely used in the U. S., but yields dextrins inferior for certain purposes to those made from the other starches, but the good adhesive properties and low cost of these maize dextrins make them a good manufacturing proposition. Potato starch is chiefly used on the Continent and in England. It yields a superior type of dextrin that is easy to make, but suffers from the drawback that the dextrin has a rather bitter taste and pungent smell which render it unfit for use in envelope gums or foodstuffs. Tapioca dextrin is free from these objections, and possesses the highest adhesive properties of all the dextrins, but its manufacture demands a higher temperature than the others.

Acids, such as sulfuric, hydrochloric, nitric, oxalic, or phosphoric, are used, but it appears better to use a volatile acid if the percentage of sugar is to be kept low, as in the case of dextrins to be used in the manufacture of adhesives. Certain acid salts have also been used, but possess no advantage over the acids alone, and have the disadvantage of leaving the dextrin unsuitable for some purposes such as foodstuff manufacture.

The starch is mixed intimately with a solution of the acid to be used as catalyst, either by making a small master batch and mixing this with the rest of the starch, or, better, by spraying and then storing the acidified starch in bins until a sample withdrawn from the bin dissolves readily in warm or cold water. The amount of acid used can be varied over a wide range according to dextrin required, and may be from 0.1 to 0.3 kgs. of 40° Bé. nitric or hydrochloric acid per 100 kgs. of starch. When using sulfuric acid, twice the amount suggested above is used.

The acidified starch, after the maturing process, is dried to a moisture content of less than 3 per cent., or passed straight to the roasters and heated from 110°-160° C., according to the type of dextrin and the starch employed. When the desired degree of dextrinization is reached, the roasters are discharged and the dextrin cooled either by spreading out on trays and passing a current of cold air over it, or, in the latest type of plant, by passing through a water-cooled apparatus.

The dextrin is then remoistened by allowing it to remain exposed to air for some fourteen or fifteen days, or by passing continuously through a machine where water is sprayed on it from atomizers as the dextrin is falling in a fine cloud from the top of the apparatus.

Wet Method

The dextrins ordinarily marketed are made by the roasting or torrification process outlined above, but the wet method deserves mention, as it is that usually employed to obtain adhesive pastes, of which many thousands of tons are produced and marketed annually. Most of the acids or hydrolyzing agents used in the roasting process may be used in the wet process. The starch is suspended in water and the catalyst added. The mass is then heated with efficient stirring, the heating being continued until the process of hydrolysis, as shown by the viscosity, has reached the desired stage, when the acid is neutralized to prevent further hydrolysis and the paste evaporated to the desired consistency.

The method using enzymes is readily carried out with a saving of time and heat, the final product often requiring no further evaporation before running off into casks for transport or storage. The starch suspension is adjusted to a pH of 4.7 with sulfuric acid, and heated to 70° C. with efficient stirring. It is next cooled to 50° C., malt extract added, and the temperature slowly raised again to 70° C. When the process has reached the required stage, the acid is rapidly neutralized by addition of alkali and the temperature raised to 90° C. with live steam to destroy the enzymes present.

Maize starch is often used for this method, and a smooth paste with good adhesive properties is obtained. This paste forms the basis of many adhesives for the mounting of photographic prints. The rather high temperature of the reaction, 70°-75° C., is necessary in order to avoid the formation of dextrose; and in place of malt diastase, Taka diastase or other similar enzymes may be employed with good results. Although the activity of the enzyme is generally destroyed at the high final temperature, in some cases it is not; and to guard against these rare occasions, phenol or formaldehyde may be added both to destroy the last trace of enzyme and to act as a preservative against mold growth.

Some dextrins are treated in the remoistening plant to render their odor less pronounced and their color lighter. For this purpose hydrogen peroxide or sodium bisulfite have been used, and also treatment with sulfur dioxide or benzoyl peroxide has been patented. In the writer's experience, the after-treatment of a dextrin with these reagents is not very successful, as, in any case, when the dextrin is used for a variety of purposes the deodorizing or decolorizing agents are destroyed and the final product is just as if the dextrin had not been treated at all.

To ensure good color and odor, the roasting process must be carefully controlled, as it is during this process that the substances responsible for poor color and odor are produced, and under the correct roasting conditions their formation is kept as low as possible. At a rough estimate the amount of dextrin obtainable from 110 lbs. of starch is 100 lbs., the figures varying very little from this. The difference is chiefly moisture, especially with potato dextrin, which contains about 11 per cent. of moisture as against 20 per cent. generally found in potato starch. Abstracted from *The Chemical Trade Journal*, (London) Jan. 10, '36, p21.

Lactic Acid Uses in Tanning

Being possible to control fermentation processes as desired, it is easy to prevent accidents due to fermentation to which tannin solutions are liable, and to avoid use of strong mineral acids. Lactic acid is useful in deliming, in the suspenders, and in some finishing processes, says *The Leather Trades' Review*, quoting Dr. L. Pollak. Its use in chrome tanning is limited to dyeing and finishing.

Its addition to tanning liquors does not cause the flocculation noticed when mineral acids are used. Even if this should occur, it can be removed by the addition of a little more lactic acid, and Thomas and Forster have shown that less lactic acid than formic is required for dissolving such precipitates (see also Wilson's *Chemistry of Leather Manufacture*).

The normal sodium salt of lactic acid is a non-crystalline hygroscopic material with glycerine-like properties; thus, lactic acid could be used with advantage in the soda-acid-bleaching of leather.

Commercial lactic acid is produced by fermentation. It must be neutralized as formed, with calcium carbonate, as the bacteria responsible for the production die in a concentration of 0.6 to 0.8% lactic acid. For this reason only limited amounts of lactic acid can be produced in tan liquors. The calcium lactate formed on neutralizing is next decomposed with sulfuric acid, the calcium sulfate filtered off through a press, and the liquor containing the lactic acid concentrated *in vacuo*. There are several commercial strengths, of which the following analytical figures are typical:

Color	50% wt. Orange	80% Brownish yellow
S.G. °Bé	21.18	30.0
Total acid %	49.86	81.18
Free acid %	46.80	66.60
Iron %	0.003	0.002
Lime	traces	traces

In the 80% acid considerable difference exists between the total and free acid figures, but this does not mean that part of the acid is present in the form of a salt. The difference is due to the fact that on heating and concentration, lactic acid is inclined to form anhydrides (lactones) by loss of water from the acid molecule. According to Eder and Futter (*Helv. Chim. Acta* 9, 355), lactyl lactic acid is present in the concentrated acid. The lactic acid converted into anhydrides is not lost to the user. The proportion of total acid to free acid (or anhydride) is dependent on the concentration, temperature, and storage. The anhydrides are not converted at once into free acid on dilution. There appears to be an equilibrium proportion of free acid to anhydride for each concentration. This is approximately as follows:

Total acid content	Free acid	Anhydride
80%	62 %	18 %
50%	46.5%	3.5%
20%	19.6%	0.4%

The conversion of anhydrides into free acid takes place slowly at room temperatures but much more rapidly at 100°C. If the acid is required practically anhydride free, it must be diluted 4 to 5 times with water and heated for a few hours at 100°C. in a suitable wooden vat, as suggested by Gehrke and Willrath (*Zeit. f. Physik. Chem.*, 142, 301). The use of such pre-heated lactic acid is recommended for suspenders.

The most favorable temperature for the production of lactic acid from non-tans is 35°C. at a temperature seldom reached in suspenders. Below 12° C., formation of the acid ceases. On the other hand, at temperatures of 12-20°C. harmful mycoderma develop. The correct production of lactic acid in the suspenders is not easy and is not facilitated by the addition of glucose. Apart from the temperature difficulty, the tans present reduce the activity of the bacteria.

Fermentation of the tan liquors proceeds approximately as follows: Alcoholic fermentation by means of yeast takes place, in which the sugars are converted into alcohol and CO_2. As the alcohol is converted into acetic acid, lactic fermentation proceeds in which sugar is converted into lactic acid, and later certain non-tans are also converted into lactic acid. At the point of maximum possible acid content (0.6%), the lactic bacteria die and molds are liable to develop. Tannase is now formed and decomposition of the tans occurs. It is not widely known that water containing nitrate is harmful during the production of lactic acid. During fermentation, nitrous acid is formed, and this destroys bacteria and oxidizes tannins. There are few tannery water supplies free from nitrates, and irregularities in the suspenders can rise from this cause. It must be remembered, too, that lactic acid may be produced from non-tans, some of which are required for the production of a full good quality leather. The work of Jakimoff and Kojalowitsch (*Coll.* 1932, 6 and 16), Andreasch (*Der Gerber*, 1895, 1896), Mudrak (*Technicka Hlidka*, 1934, p. 77), and Blank (*J. A. L. C. A.*, 1935, p69) should be consulted. The production of fermentation acids requires rigid control and cleanliness. The use of manufactured lactic is worth consideration. The strong buffering effect of lactic acid is described in detail by von der Heide (*Ledertech. Rundschau*, 1929, p49). These notes abstracted from *Hide & Leather*, Feb. 8, '36, p28.

Textiles

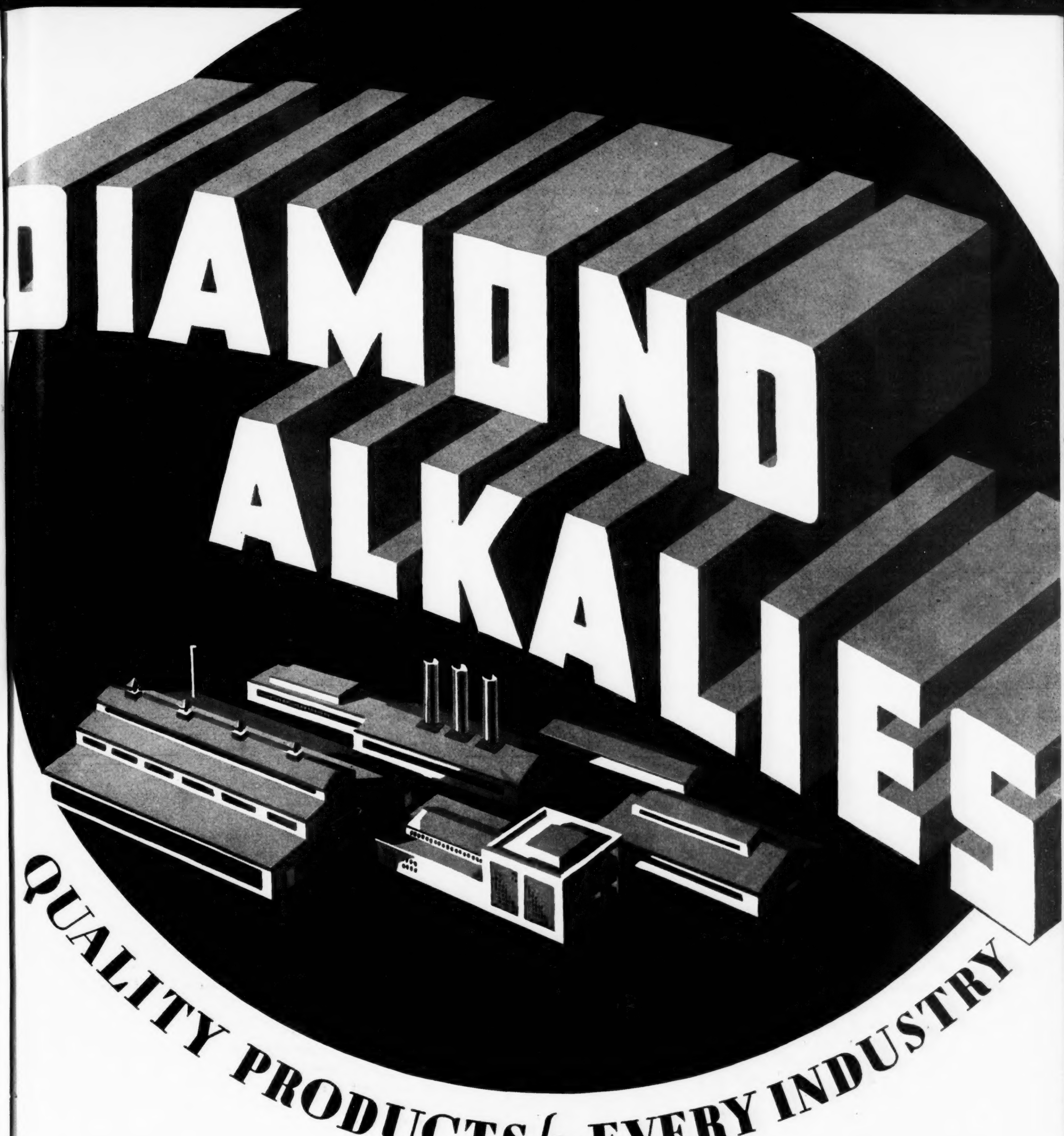
Covering oxycellulose by trick dyeing is said to be possible with direct dyes in an acid bath. Process is carried out in a warm bath with a wetting agent that is effective in the presence of acid, by means of formic acid. It is of interest in cases of very mild attack where the goods are not at all tendered. Reported by A. J. Hall in *Textile Colorist*, p111, '36

Mothproofing Agent

Eulan B L, a new mothproofing agent which also disinfects, is an I. G. product being offered by General Dyestuff. It is soluble in organic solvents and is especially recommended for dry cleaning purposes, being applied in a ten per cent. solution which produces a safe protection against moths.

Month's New Dyes

General Dyestuff recent releases include: Fastusol Yellow LRTA Extra Conc., a direct dyestuff producing a reddish yellow on rayon and cotton and well suited for union dyeing. Diazo Rubine BH produces full Bordeaux shades when diazotized and developed with Beta Naphtol. Katigen Direct Blue BR Extra Conc., is a direct dyeing sulfur dyestuff of high concentration, suitable for the production of navy blue shades. Useful for dyeing cotton or rayon in any stage of manufacture, as it is soluble, dyes level, and exhausts well, making it suitable for machine dyeing. Katigen Brown BR is a sulfur dyestuff which produces medium shades of brown



58% Soda Ash . . . Bicarbonate of Soda . . . 76% Caustic Soda . . . Carbon Tetrachloride . . . Diamond Soda Crystals . . . Modified Soda . . . Special Alkalies . . . Liquid Chlorine.

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of excellent all-round fastness on cotton or rayon. Like Katigen Direct Blue BR Extra Conc., it is available in the CF form to meet the specifications of the U. S. Rubber Ass'n. Katigen Bordeaux BYA is a sulfur dyestuff which yields on cotton as well as on rayon claret shades of a reddish cast. A special brand is available under the designation of CF to meet the copper and manganese specifications of the U. S. Rubber Ass'n.

The first dyestuffs that perfectly meet requirements of dyeing acetates are said to be available in the "Solacet" range developed by I.C.I. These colors have a direct affinity for cellulose acetate and their application can be controlled more accurately than ever before possible. Being soluble in water, they enable the acetate to be treated similarly to cotton dyed with direct cotton colors. The first colors to be marketed are fast scarlet and fast crimson. It is expected that the dyestuffs division of du Pont will handle them in the U. S.

"Sutter's Gold" and "Blubonnet Blue" are two new spring colors created by Margaret Hayden Rorke and announced by The Textile Color Card Ass'n.

Dyestuffs Division of du Pont announces the following: Pontachrome Azure Blue BR, a chrome color, for use in dyeing bright, medium shades of blue on wool rawstock, yarn and piece-goods. Sulfanthrene Orange RC Paste (Patent Applied For), "Sulfanthrene" Brown GC Paste (Patent Applied For), and "Sulfanthrene" Scarlet GC Paste (Patent Applied For) are vat colors especially designed for printing delustered rayon. They may also be printed on bright rayon and acetate fiber materials with satisfactory results.

Mildew-Proof Agents

Shirlan A. (Patent Applied For) and Shirlan Extra are recent additions to the du Pont's line of fine chemicals. Former is important for use in conjunction with "Aridex" WP in the treatment of goods to give them mildew-proof and water resistant properties. Shirlan Extra finds its chief use in mildew-proofing heavy cotton fabrics which are subjected to weathering, and it is also admirably suited for application to wool yarns and fabrics. It is not recommended for use with "Aridex" WP.

One-Bath Waterproofing Agent

A one-bath waterproofing agent, Waxol W, is an I. C. I. product. It enables waterproofing of all types of textile fabrics to be carried out by a single impregnation process and without making them impermeable to air, at the same time giving a pleasing handle to the material proofed with it.

Softening Agents

Cirrasol L C and Cirrasol S A, two softening agents of an entirely new type, are announced by I. C. I., Ltd. The first has high softening power and is applicable to all types of fibres. The fact that it does not tend to become rancid or to discolor on stored goods makes it of particular interest for white work and rayon finishing. The latter is of value for the softening of artificial silks, giving a soft effect described as intermediate between that given by soluble oil and that given by wax finishes. It is stated to be unaffected by magnesium salts such as are used in the preparation of sizing compositions and to possess the property of preventing the electrostatic troubles which are often encountered in processing textile fibres, particularly cellulose acetate artificial silk.

Brilliant Avirol L-200 Paste (Patented), a new fatty alcohol sulfate textile softening agent, is a du Pont product designed to give surface smoothness in addition to the full, pliable finish characteristic of the Avirol products. It is said to be free from danger of rancidity or discoloration during calendering or during the storage of the finished fabrics.

Rayon Resist

A process for resisting rayon in a simple but limited manner is said to be applicable especially to knitted goods containing unbleached cotton and rayon. Light and medium shades can be dyed at the boil in an acid bath with 5 to 10% formic acid, and after 15 to 20 minutes should be rinsed with hot water to clear the rayon. The same effect can be obtained on a union of unbleached cotton with bleached mercerized cotton, to resist the latter. *Textile Colorist,* p95, '36.

Leather

An 83 per cent. soda finished Turkey Red Oil, for fat liquoring in the leather trade, is being produced by I. C. I., Ltd.

Arresting Leather Deterioration

The deterioration in upholstery leather in industrial atmospheres, believed due to the accumulation of sulfuric acid in the leather, and the deterioration of shoe upper leather frequently found in the vamps, due to perspiration, is the subject of laboratory tests being conducted by The National Research Council of Canada, Ottawa, Ont., Canada.

Coatings

A two-coat type of paint and a sun resistant paint pigment have been developed at the Devoe & Raynolds laboratories. A complete new two-coat system for house painting, which will revolutionize this important part of the industry is promised. New paint involves a special treatment of linseed oil, known as controlled penetration, making a non-penetrating oil which seals the surface pores of wood and lays a solid non-cracking foundation for the second or top coat of paint. The paint pigment successfully combats destructive chemical changes wrought by the ultra-violet rays of sun.

Lacquer Linings for Foodstuff Cans

The detergent action of practically all foodstuffs on tinplate has made necessary the application of a thin coat of lacquer as a protective film between the tin surface and the foodstuffs. Lacquers for food cans are made from non-poisonous raw materials. These are comparatively few and consist of resins, oils, and diluents. The resins used are chiefly fossil gums, for while synthetic resins are continuously being tried, as yet they have not proved superior to the established fossil gums in the manufacture of food lacquers. The oils used are linseed oil and tung oil, the diluent is commonly petroleum distillate. A. L. Mathison, in a paper to the Food Group digested in *Chemistry and Industry,* Jan. 24, '36, gives also the methods of lacquer manufacture for this purpose.

Rust-Proofing Paint

Osmal, a new rust-proofing paint on the German market, is prepared with ammoniated activated carbon. One kg. of this paint covers 16 to 20 sq. meters of surface as compared with 4 to 5 meters of red lead paint. *The Chemical Trade Journal* (London), Feb. 7, '36, p112.

Titanium-Silicate Pigment

"Ti-Sil" is a titanium-silicate base pigment, for use in exterior white paints. Krebs Pigment, producer, claims that while it provides both a prime pigment and well chosen extenders as one combination pigment, it is not intended for use as a sole pigment in exterior paint formulations.

Furfural Derivatives as Lacquer Plasticizers

In the laboratories of Hercules Powder tests are being made on new industrial applications of furfural and its derivatives, special attention being directed to the possible use of the fenchyl and bornyl esters of furoic acid as plasticizers for cellulose esters. One conclusion is that tetrahydrofurfuryl terpinene maleate, in particular, is a promising plasticizing resin. J. N. Borglin, *Ind. & Eng. Chem.,* Jan. '36.

Pyridine Resins

Resins possessing the unusual property of solubility, both in water and in organic solvents, have been found to result from inter-action between certain pyridine derivatives and acylating

agents. Yellow to pale brown resins are obtained, for example, by reaction between N-methyl-2-pyridine benzyl amide and an acyl chloride in equal molecular proportions. *Synthetic & Applied Finishes,* Feb. '36, p267.

Metals and Alloys

A process to plate articles with a silver-tin alloy has been formulated in the Dept. of Chemistry, Washington University. Plating refuses to tarnish, looks as good as pure silver, polishes as well and wears better. Solution contains 20-40% silver, tin comprising remainder of the alloy.

Light-weight Metal

"Lithium Six," extracted from ordinary lithium, at the Bartol Research Foundation, is a metal claimed to be ten per cent. lighter in weight than any previously known. It is said to be even lighter than solidified gas. Present practical value of the metal is small but the potential fields of use are many.

Surface Protection of Aluminum and Magnesium

Eloxal is the name of a new Austrian process for the surface protection of aluminum and magnesium. By this method, the surface of the metal is oxidized electrolytically, and process is outlined in detail in *The Chemical Age,* Jan. 4, '36, Metallurgical Section, p4.

Aluminum Cans for Beer

Aluminum-coated steel containers for beer may soon vie with those made from tin, in view of the high prices for the latter metal. An aluminum container would not require a lacquer lining to protect the flavor of the beer, which cost difference is also in its favor.

Bright Nickel Process

A bright nickel process is being licensed by Weisberg & Greenwald, for which a number of installations are already in operation: plating on brass, steel, and zinc die castings. Deposits produced from this solution are said to have a mirror-like brightness; the brightness increases with the thickness of the deposit. This sometimes results in covering up minor imperfections in the base metal to a considerable extent. Most notable feature is their ductility.

Production Magnesium Metal

A new furnace reduction process has solved the problem of obtaining magnesium oxide, by the use of carbon as the reducing material, electrothermally, and a pure magnesium metal. After proven tests in a large plant in Austria it is being applied commercially. Described in *The Chemical Age,* Jan. 4, '36, Metallurgical Section, p3.

Magnesium Metal from Ocean Water

Extraction of magnesium metal from ocean water and production in commercial quantities has been perfected by Frank Petersen, aviation department, San Jose State College. Through an electrolytic cell of his own design no unnecessary chemical action occurs in the process, resulting in a 99.897% pure metal.

Paper

Umberto Pomilio reports the following analysis of a sample of cellulose from rice straw prepared by his process: Alpha cellulose, 95.3%; hemicellulose, 4.43%; ash, 0.27%; and copper number, 0.46%. New plant operations for production of cellulose by this method are outlined, together with proposed production figures in tons. *The Chemical Trade Journal,* Feb. 7, '36, p114.

Hardened Papers

An abstract from *Zellstoff und Papier* states that hardened papers are combinations of layers of special sorts of paper with couches of artificial resin. These resins are condensation products of phenol or urea and are chosen from the use to which the paper is to be put. Process of manufacture and uses are also outlined.

Fibre Board Process

Manufacture of fibre board by mixing ammonium phosphate, boric acid and a non-inflammable water-proofing composition having fibres in fluid suspension is the subject of a patent issued to Robert G. Quinn, Glens Falls, N. Y.

Glass and Ceramics

A glass that polarizes light has been invented by Edwin H. Land, and is known as "Polaroid." It is said to be of special value in ending fatalities from headlight glare, besides having numerous other adaptations equally as useful.

Naples Yellow as Ceramic Under-Glaze

Naples Yellow in the ordinary commercial form can be used as a ceramic under-glaze up to temperatures corresponding to Seger cones 010 to 03*a*. The effect of the addition of zinc oxide is to increase, at first rapidly and then more slowly, the intensity of the tint, but to reduce resistance of the pigment to heat. L. Stuckert, *Sprechsaal,* 1935, Nos. 21-24.

Glass Furniture in Color

All-glass furniture in various colors, constructed from Libbey-Owens-Ford new tempered glass, vitrolite and mirror glass, is in production.

Miscellaneous

Oiticica oil, which sprang into prominence overnight last year because of the scarcity and high price for Chinawood, is the subject of a detailed report by Charles Holdt, superintendent of Brasil Oiticica S. A., in an article in *Drugs, Oils & Paints,* Feb. '36, p64. Manufacturing operations, improvement in quality, and physical and chemical properties are discussed.

Chewing Gum with Rubber Latex Base

Rubber latex is used as an important ingredient in chewing gum base; for example, in the following preparation 100 parts rubber latex are agitated with 50 parts water, and 7 cocoa powder, 85 pulverized coumarone resin and 105 powdered hydrogenated vegetable oil are added by parts. Mixture is gradually heated to 110° C. and agitated for two hours before removal. *British Plastics & Moulded Products Trader,* Feb. '36, p430.

Treatment Gas Mains

For the treatment of gas mains, a special liquid is being sold by Carbide & Carbon under the name "Carboseal," by license from United Gas Improvement Co.

Latex-Insulated Hair Cloth

Nukraft, an upholstery material for use as a spring decking in the construction of furniture, railway, bus, automobile and theatre seats, as well as mattresses, is announced by B. F. Goodrich Co. Material consists of a hair cloth, insulated with latex, fabricated into loops forming a structure of figure eight springs. This loop fabrication serves to enhance the natural resiliency of both the hair and the latex.

Resin-Rubber Mixtures for Brakes, etc.

Resin-rubber combinations for use in manufacturing brake linings, clutch facings, etc., are announced by Bakelite Corp. Heat resistance in these new products is improved by producing sections of asbestos filled material bonded with two parts rubber and one part resin. Thermoplasticity at high temperatures is greatly minimized and wear resistance is also improved.

Resinous Products in Road Surfacing

Official practical tests recently made in France on the use of rosin in road surfacing showed that the addition of the resinous pitch to the coal tar has the advantage of greater smoothness, a better adherence to the ground and lasts longer.

Antioxidant

Nonoxol H P, an antioxidant for oils and fats, is announced by I. C. I., Ltd.

Snow and Ice Remover

Pulverized quicklime, due to its ability to inhibit rust or corrosion in metal, is reported to be effective in removing snow and ice from pavements and roadways. The heat generated during slaking of pulverized quicklime is sufficient to remove or melt all ordinary ice or snow. An abstract from *Limeographs* in *Rock Products*, Feb., '36, p44.

Dispersing Agent for Latex

Dispersol L is a dispersing agent for latex compounding being offered by I. C. I., Ltd.

Cyclohexanol Esters in Perfumes

The purified esters of cyclohexanol have been investigated as to their possible use in perfumery by Howards & Sons, Ilford, England. The cyclohexanol phenyl acetate was by far the most interesting The smell was strongly reminiscent of phenyl ethyl alcohol with a distinct suggestion of civet. There does not appear to be any offensive residual odor. The boiling point is sufficiently high to give reasonable lasting power which could be increased by judicious blend of suitable fixatives. *Perfumery & Essential Oil Record*, Jan. '36.

Tests on Sodium Chlorate

Improved methods of manufacture of sodium chlorate, with resulting lower costs, are under investigation at the Bureau of Chemistry and Soils. The Bureau of Plant Industry also is experimenting on the use of sodium chlorate in field trials on large areas. It is said that sodium chlorate may be made on a large scale at a Government plant to be built at Muscle Shoals if this investigation develops sufficiently attractive new manufacturing procedure.

Potash from Molasses

Production of potash from surplus molasses is described by W. J. Alcock in Indian Patent 20,396.

Removing Paraffin Deposits in Flow Strings

The use of high-gravity petroleum solvents for removing paraffin from the flow strings of oil wells is producing favorable results in the Oklahoma City field. The means by which one of the major operators overcome this obstacle in an efficient manner is described briefly in an article in the Engineering and Operating Section, *The Oil & Gas Journal*, Dec. 5, '35, p37.

Fat from Coal

The problem of producing fat and ultimately soap from coal is claimed by German coal research workers to have been successfully solved. The German Sebaceous Acid Works, Witten-am-Ruhr, has been founded to operate on a large scale the new process for synthetic production of sebaceous acid from coal. The acid will be used for the manufacture of fats, including soap and lubricating grease.

Seek Use for New Viscous Oil

"Viscous oil," a Western petroleum product, resembles clear, transparent honey, but of so thick and sticky a character that the liquid can scarcely be poured from a bottle. With substantial quantities available upon demand, petroleum engineers are speculating on possible uses for a fluid which is so sluggish that it measures, at 100° F., as high as 144,000 on the Saybolt scale of viscosity. New oil is purely hydrocarbon in composition.

New Uses for Pitch

Pitch of M. P. 300°-400° F. has been found to serve as a highly satisfactory powdered fuel for the direct firing of rotary lime kilns. The pitch is marketed in the form of flakes, produced on rotating cooled drums or on moving water-cooled metal belts. Another use for pitch has developed with the recent installation of several thousand miles of steel pipe for conducting gas, requiring coatings for protection against corrosion. Coal-tar pitch has been used in large quantities by main-layers. A non-pressure saturating process of porous articles is also described in an abstract from the *Manchester Guardian Commercial* by *The Chemical Trade Journal* (London), Feb. 7, '36, p104.

Miscellaneous Booklets

A. C. S., New York & North Jersey Sections. *The Indicator*, February, A. C. S. news, along with up-to-date items of industrial and educational interest.

Agricultural Experiment Station, Univ. of Illinois, Urbana. "Recent Developments in the Utilization of Soybean Oil in Paint," by W. L. Burlison. Circular 438.

American Petroleum Institute, 50 W. 50th st., N. Y. City. "American Petroleum Industry," recently released volume, covers petroleum refining progress since 1912, the present position of the industry, and future outlook.

American Society for Testing Materials, 260 S. Broad st., Philadelphia. 1935 edition of A. S. T. M. Tentative Standards, 1500 pages, 290 standards. Many previous specifications have been revised, bringing the volume up-to-date. $8.00 in cloth binding, $7.00 with heavy paper cover.

American Society for Testing Materials. A. S. T. M. Standards on Rubber Products, prepared by Committee D-11. Methods of testing, specification requirements, and sources of information are included in this 204 page booklet. $1.25.

American Society of Refrigerating Engineers, 37 W. 39th st., N. Y. City. Proposed standard method of rating and testing air conditioning equipment, announced by joint committee on Rating Commercial Refrigerating Equipment. Technical material for those vitally interested. 20c.

The Chemical Foundation. "The Only Real Security," an interview with Henry Ford by Samuel Crowther, reprinted from the *Satevepost*, is No. 7 in the Foundation's series "The Deserted Village—American Political Economy." A vital, pointed analysis of present business and political conditions by one of America' foremost industrialists.

The Federal Trade Commission, Washington. Annual report of the commission for fiscal year ended June 30, 1935.

International Tin Research & Development Council, 149 Broadway, N. Y. City. "Tin and Civilization," by D. J. MacNaughtan. This distinguished paper, recently presented before a meeting of the American Institute of Mining & Metallurgical Engineers, discusses tin, its properties, and past and future uses.

International Tin Research & Development Council. "Striations in Tin Coatings on Copper," by Bruce Chalmers and W. D. Jones. Series A, No. 23. An important point in development of tin coatings is thoroughly discussed in this 10 page booklet.

International Tin Research & Development Council. "Tin and its Uses," by D. J. MacNaughtan.

Mellon Institute, Pittsburgh. "The Municipal Smoke Problem," by H. B. Meller and L. B. Sisson, comes straight from smoky Pittsburgh, at the suggestion of teachers in Pittsburgh high schools. Individual needs are discussed in the problem considered by authorities to be of vital importance in public health.

Metal Products Exhibits, Inc., Rockefeller Center, N. Y. City. Activities of this permanent exhibition are discussed, along with a short article on use of metals in modern architecture.

National Bureau of Standards, Washington. "Comparative Wear of Chrome-tanned, Vegetable-tanned, and Retanned Sole Leather." Research Paper 834. 5c.

National Bureau of Standards. "Influence of Some Sulfur-Containing Tanning Materials on the Deterioration of Vegetable-tanned Leathers by Sulfuric Acid." Research Paper 835. 5c.

Univ. of California, Agricultural Experiment Station, Berkeley, Cal. "Sulfuric Acid for Control of Weeds," by W E. Ball and O. C. French. Bulletin 596. Complete treatment stresses actual application of this process.

U. S. Census Bureau, Washington. U. S. Census of Agriculture for Indiana, 1935, with statistics on farms, values, acreages, etc., given by counties. 25 pages. 5c.

U. S. Census Bureau. U. S. Census of Agriculture for New York, 1935. 5c.

U. S. Dept. of Agriculture, Washington. "Handbook of Official U. S. Standards for Soybeans." These standards, effective Sept. 3, '35, represent complete inspection and classification requirements for this increasingly important raw material. 5c.

U. S. Dept. of Agriculture. "Manual on Preservative Treatment of Wood by Pressure," by J. D. MacLean. Misc. Publication No. 224. 15c.

U. S. Dept. of Commerce, Bureau of Foreign & Domestic Commerce. "Industrial Property Protection in Canada," by James L. Brown. An exceptionally complete study of a question which should be of more than passing interest to every industrialist in this country. 10c.

U. S. Tariff Commission, Washington, D. C. Report (No. 104, 2nd series) to the President, on Synthetic Camphor. 5c.

U. S. Tariff Commission, Washington. U. S. 1934 census of dyes and other synthetic organic chemicals. 15c.

U. S. War Dept., Corps of Engineers, North Pacific Division, Portland, Ore. "Available Raw Materials for a Pacific Coast Iron and Steel Industry," by Col. Thomas M. Robins. An exhaustive survey of market possibilities and potential raw material sources, in 4 volumes containing over 1000 pages.

U. S. Chemical Patents

A Complete Check-List of Products, Chemicals, Process Industries

Agricultural Chemicals

Use of carbon dioxide in fruit preservation. No. 2,028,970. Will H. Ewell, Los Angeles.

Production calcium arsenate insecticides. No. 2,029,264. Simon Klosky, Roselle, N. J., to American Agricultural Chemical Co., Newark, N. J.

Production fertilizer by concentrating sewage. No. 2,029,648. Oliver V. Austin, Hattiesburg, Miss.

Treatment of commercial dicalcium phosphate. No. 2,029,967. Franciscus Visser't Hooft to Lucidol Corp., both of Buffalo, N. Y.

Production parasiticides comprising compound from group, lauryl alcohols, esters, or amines. No. 2,030,093. Euclid W. Bousquet, George D. Graves, and Paul L. Salzberg, Wilmington, Del., to The Grasselli Chemical Co., Cleveland, Ohio.

Conditioner for granular, crystalline or amorphous products comprising mixture tricalcium phosphate and starch. No. 2,030,461. Henry V. Moss, St. Louis, Mo., to Swann Research, Inc., a corp. of Ala.

Cellulose

Process reducing the water content of cellulose films. No. 2,028,296. Milton J. Shoemaker, Madison, Wis., to Carbide & Carbon Chemicals Corp., N. Y. City.

Method of seasoning extruded cellulose ester plastic sheeting. No. 2,028,502. Paul W. Crane, Montclair, and Reuben T. Fields, Arlington, N. J., to Du Pont Viscoloid Co., Wilmington, Del.

Use of cellulose acetate as facing for printing plate. No. 2,028,710. Hylton Swan, Upper Montclair, and Sigfried Higgins, Verona, N. J., to Bakelite Corp., N. Y. City.

Use of cellulose acetate on printing plates. No. 2,028,711. Hylton Swan, Upper Montclair, and Sigfried Higgins, Verona, N. J., to Bakelite Corp., N. Y. City.

Production cellulose esters of organic acids. No. 2,028,761. Camille Dreyfus, N. Y. City, and George Schneider, Montclair, N. J., to Celanese Corp. of America, a corp. of Del.

Method reducing the viscosity of cellulose esters of organic acids. No. 2,028,762. Camille Dreyfus, N. Y. City, and George Schneider, Montclair, N. J., to Celanese Corp. of America, a corp. of Del.

Method purifying cellulose acetate in presence of sulfuric acid catalyst. No. 2,028,763. Camille Dreyfus, N. Y. City, and George Schneider, Montclair, N. J., to Celanese Corp. of America, a corp. of Del.

Production alkoxy fatty acid esters of cellulose. No. 2,028,792. Carl J. Malm, Rochester, N. Y., and James D. Coleman, Columbus, Ohio, to Eastman Kodak Co., Rochester, N. Y.

Production stabilizing sheet vulcanized fiber. No. 2,028,932. Herbert R. Stratford to Horace B. Fay, both of Cleveland, Ohio.

Process for esterification of cellulosic material. No. 2,029,481. Joseph F. Haskins, Wilmington, Del., and William F. Underwood, Waynesboro, Va., to Du Pont Cellophane Co., Inc., N. Y. City.

Production nitrocellulose. No. 2,029,547. Milton O. Schur to Brown Co., both of Berlin, N. H.

Fibrous esterification of cellulose. No. 2,029,900. Russel H. Van Dyke, Cyril J. Staud, and Harry Le B. Bray to Eastman Kodak Co., all of Rochester, N. Y.

Production cellulose organic ester compositions containing a propionyl ester of glycerol. No. 2,029,925. David C. Hull, Kingsport, Tenn., to Eastman Kodak Co., Rochester, N. Y.

Production mixed organic esters of cellulose from solution thereof. No. 2,030,883. Carl J. Malm to Eastman Kodak Co., both of Rochester, N. Y.

Method treating films or foils of organic cellulose esters. No. 2,030,983. Max Hagedorn, Dessau in Anhalt, and Paul Moller, Dessau-Ziebigk, Germany, to Agfa Ansco Corp., Binghamton, N. Y.

Production compositions comprising cellulose derivative, and N-alkoxyalkyl aryl sulfonamide as plasticizer. No. 2,031,206. Bozetech C. Bren, Cedar Grove, N. J., to Du Pont Viscoloid Co., Wilmington, Del.

Coal Tar Chemicals

Production para-cyclohexyl-phenols. No. 2,028,271. Karl Brodersen and Hermann Behncke, Dessau in Anhalt, and Ernst Korten, Frankfort-am-Main-Fechenheim, Germany, to General Aniline Works, Inc., N. Y. City.

Production intermediates derived from 4-amino-diphenylamine derivatives. No. 2,028,373. Arthur Zitscher and Wilhelm Seidenfaden, Offenbach-am-Main, Germany, to General Aniline Works, Inc., N. Y. City.

Production water-insoluble azodyestuffs derived from benzocarbazoles. No. 2,028,469. Wilhelm Neelmeier, Leverkusen-Weisdorf, and Heinrich Morschel, Cologne-Deutz, Germany, to General Aniline Works, Inc., N. Y. City.

Production alizarin and alizarin salts. No. 2,028,879. Donald G. Rogers, Ridgewood, N. J., to National Aniline & Chemical Co., Inc., N. Y. City.

Production anthrapyridone sulfonic acids. No. 2,029,007. Klaus Weinland, Leverkusen-I. G. Werk, Germany, to General Aniline Works, Inc., N. Y. City.

Production anthraquinone derivatives. No. 2,029,239. Georg Kranzlein, Frankfort-am-Main, Hans Schlicheumaier, Kelkheim in Taunus, and Ludwig Schornig, Frankfort-am-Main, Germany, to General Aniline Works, Inc., N. Y. City.

Production tri-fluoro-methyl-phenyl-azo-diamino pyridines. No. 2,029,315. Max Engelmann to E. I. du Pont de Nemours & Co., both of Wilmington, Del.

Production arylamides of the 2, 3-hydroxynaphthoic acids. No. 2,029,509. Wilfred Archibald Sexton, Huddersfield, England, to Imperial Chemical Industries Ltd., a corp. of Great Britain.

Production symmetrical di-(arylamino)-hydroxy-benzenes. No. 2,029,727. Leopold Laska and Oskar Haller, Offenbach-am-Main, Germany, to General Aniline Works, Inc., N. Y. City.

Production tetrazoles of the camphor group. No. 2,029,799. Karl Friedrich Schmidt, Ludwigshafen-am-Rhine, Germany, to E. Bilhuber, Inc., Jersey City, N. J.

Production unsulfonated diacylated diamines. No. 19,842—reissue. Guillaume de Montmollin, Jacob Danuser, Gerald Bonhote, and Hans Johner to Society of Chemical Industry in Basle, all of Basel, Switzerland.

Production thiazole derivatives. No. 2,030,373. Treat B. Johnson, Bethany, Conn., to Winthrop Chemical Co., Inc., N. Y. City.

Production blended pitch product from coal tar. No. 2,030,528. Stuart Parmelee Miller, Englewood, N. J., to The Barrett Co., N. Y. City.

Production low melting point pitch product from coke oven tar. No. 2,030,575. Edward H. Ellms, Fairlawn, N. J., to The Barrett Co., N. Y. City.

Production nitroanthraquinone-azoles. No. 2,030,823. Paul Nawiasky, Ludwigshafen-am-Rhine, Berthold Stein, Mannheim, and Erich Berthold and Robert Zell, Ludwigshafen-am-Rhine, Germany, to General Aniline Works, Inc., N. Y. City.

Production 1-amino-2-anthraquinonyl-anthraquinone-azoles. No. 2,030,824. Paul Nawiasky, Erich Berthold, and Robert Zell, Ludwigshafen-am-Rhine, and Berthold Stein, Mannheim, Germany, to General Aniline Works, Inc., N. Y. City.

Production compounds of the n-dihydro-1, 2, 2′, 1′-anthraquinone azine series. No. 2,030,876. Frank Willard Johnson, Pennsgrove, N. J., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production derivatives of n-dihydro-1, 2, 2′ 1′-anthraquinone azine. No. 2,030,877. Frank Willard Johnson, Pennsgrove, N. J., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production ortho-(aminoaroyl)-benzoic acids and inner anhydrides thereof. No. 2,031,143. Arthur Wolfram and Emil Hausdorfer, Frankfort-am-Main-Hochst, Germany, to General Aniline Works, Inc., N. Y. City.

Coatings

Production varnish compositions by heating mixture of Batu gum, limed rosin, and a drying oil. No. 2,028,758. Joseph B. Dietz, Lansdowne, and Edmund F. Oeffinger, Philadelphia, Pa., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production coating composition containing varnish solvent, and the pentaerythritol ester of monobasic carboxylic acid. No. 2,029,851. James A. Arvin to E. I. du Pont de Nemours & Co., both of Wilmington, Del.

Method coating rod-like article with cellulose derivative dissolved in volatile solvent. No. 2,030,160. William S. Titcomb, Andover, Mass., to Shoe Lace Co., Boston.

Production colored oxide film of aluminum or its alloys, using an organic dyestuff. No. 2,030,236. Walter Anderau to Society of Chemical Industry in Basle, both of Basel, Switzerland.

Production fast colored nitrocellulose lacquer dyed with sulfonic acid or alkali salt thereof. No. 2,030,264. Hans Nold and Wolfgang Jaeck to Society of Chemical Industry in Basle, all of Basel, Switzerland.

Coating composition comprising cooked cashew nut shell oil treated with formaldehyde, drying oil, and a synthetic resin varnish. No. 2,030,709. Lewis Edgar Munz; one-half to E. H. Sheldon & Co., both of Muskegon, Mich.

Method of moistureproofing cellulosic sheets or films using a drying oil composition. No. 2,030,962. William Hale Charch, Buffalo, and William L. Hyden and John C. Siemann, Kenmore, N. Y., to Du Pont Cellophane Co., Inc., N. Y. City.

Method coating cellulosic body with molten metal particles. No. 2,031,070. Robert R. Robinson and Edward L. Rick, Los Angeles, Cal.; Rick assigning to William D. Howze, also of Los Angeles.

Composition for coating welding rods. No. 2,031,494. Paul C. Lemmerman, East Cleveland, Ohio, to The Grasselli Chemical Co., Cleveland.

Dyes, Stains, etc.

Process for dyeing cellulose esters and ethers. No. 2,028,141. Franz Ackermann, Binningen, near Basel, Switzerland, to firm Society of Chemical Industry in Basle, Basel, Switzerland.

Production vat dyestuffs of the anthracene series. No. 2,028,384. Wilhelm Eckert and Otto Braunsdorf, Frankfort-am-Main-Hochst, Germany, to General Aniline Works, Inc., N. Y. City.

Production disazo dyestuffs. No. 2,028,439. Heinrich Clingestein, Cologne-am-Rhine, and Hans Roos and Carl Heusner, Leverkusen, Germany, to General Aniline Works, Inc., N. Y. City.

Production water-insoluble azo dyestuffs. No. 2,028,480. Richard Stusser, Cologne-Deutz, Germany, to General Aniline Works, Inc., N. Y. City.

Production azo dyestuff by coupling diazotized Tobias acid with beta naphthol in presence of third organic substance. No. 2,028,958. James D. Todd, Laurence E. May, and William L. Newbury to The Sherwin-Williams Co., all of Chicago.

Production azo colors by coupling diazotized Tobias acid with beta-naphthol. No. 2,028,959. James D. Todd, Laurence E. May, and William L. Newbury to The Sherwin-Williams Co., all of Chicago.

Production azo dyestuffs. No. 2,028,981. Hans Krzikalla, Ludwigshafen-am-Rhine, and Walther Kuehne, Mannheim, Germany, to General Aniline Works, Inc., N. Y. City.

Production vat dyestuffs of the dibenzanthrone series. No. 2,029,237. Karl Koeberle, Ludwigshafen-am-Rhine, Hugo Wolff, Mannheim, and

Patents digested include issues of the "Patent Gazette," Jan. 21 through Feb. 18, inclusive.

Emil Krauch, Ludwigshafen-am-Rhine, Germany, to General Aniline Works, Inc., N. Y. City.

Production acid dyestuffs of the anthraquinone series. No. 2,029,258. Ernst Diefenbach, Frankfort-am-Main, and Erich Fischer, Bad Soden-am-Taunus, Germany, to General Aniline Works, Inc., N. Y. City.

Production dyestuffs used to color organic cellulose derivatives. No. 2,029,312. George Holland Ellis and Frank Brown, Spondon, near Derby, England, to Celanese Corp. of America, a corp. of Del.

Production and application of new dyestuffs. No. 2,029,313. George Holland Ellis and Frank Brown, Spondon, near Derby, England, to Celanese Corp. of America, a corp. of Del.

Dyeing process comprising application of leuco vat dyestuff sulfuric acid salts to textiles. No. 2,029,351. Alec Wormald, Blackley, England, to Imperial Chemical Industries Ltd., a corp. of Great Britain.

Production azo dyestuffs. No. 2,029,555. Jose Stephens Petrus-Blumberger, Delft, Netherlands, to General Aniline Works, Inc., N. Y. City.

Production azodyestuffs. No. 2,029,591. Hans Schindhelm and Carl Theo Scultis, Frankfort-am-Main-Fechenheim, Germany, to General Aniline Works, Inc., N. Y. City.

Production ethylene azo dyestuffs. No. 2,029,647. Robert Wizinger, Bonn-am-Rhine, Germany, to General Aniline Works, Inc., N. Y. City.

Production thioindigo dyestuffs. No. 2,029,714. Alfred Hagenbocker and Rudolf Brune, Frankfort-am-Main-Hochst, Germany, to General Aniline Works, Inc., N. Y. City.

Production dyestuffs ot the triphenylmethane series. No. 2,029,830. Avery A. Morton, Watertown, and Joseph R. Stevens, Cambridge, Mass.

Process of printing native or regenerated cellulose or animal fibers with dyestuffs. No. 2,029,999. Fritz Grieshaber, Riehen, near Basel, Switzerland, to firm Society of Chemical Industry in Basle, Basel, Switzerland.

Production azo dyestuffs. No. 2,030,214. Arthur Howard Knight, Ashton-on-Mersey, England, to Imperial Chemical Industries Ltd., a corp. of Great Britain.

Production anthraquinone derivatives for use as dyestuffs. No. 2,030,-253. Hermann Hauser, Basel, and Max Bommer, Riehen, near Basel, Switzerland, to firm Society of Chemical Industry in Basle, Basel, Switzerland.

Production water insoluble azo dyestuffs. No. 2,030,327. Gerhard Schrader, Opladen, near Cologne, and Werner Zerweck, Frankfort-am-Main-Fechenheim, Germany, to General Aniline Works, Inc., N. Y. City.

Production azo dyestuffs. No. 2,030,355. Detlef Delfs, Leverkusen-I. G.-Werk, Germany, to General Aniline Works, Inc., N. Y. City.

Production water-insoluble azo dyes. No. 2,030,970. Miles Augustinus Dahlen to E. I. du Pont de Nemours & Co., both of Wilmington, Del.

Production difficultly soluble azo dyes. No. 2,030,991. Henry Jordan to E. I. du Pont de Nemours & Co., both of Wilmington, Del.

Production ink for use on vitreous surfaces comprising cobalt oxide, borax, and boiled linseed oil. No. 2,030,999. Lawrence McLaughlin, Riverside, Ill., to Western Electric Co., Inc., N. Y. City.

Production wool dyestuffs comprising the sulfonic acid of a rhodamine compound. No. 2,031,023. Max Wyler, Blackley, Manchester, England, to Imperial Chemical Industries Ltd., a corp. of Great Britain.

Production vat dyestuffs of the anthraquinone series. No. 2,031,058. Wilhelm Moser, Riehen, and Walter Fioroni, Binningen, Switzerland, to Society of Chemical Industry in Basle, Basel, Switzerland.

Dyeing and coloring of cellulose esters and ethers. No. 2,031,356. Franz Ackermann, Binningen, near Basel, Switzerland, to Society of Chemical Industry in Basle, Basel, Switzerland.

Production vat dyestuffs of the anthraquinone-2.1 (N) benzacridone series. No. 2,031,406. Walter Bruck, Mannheim, Germany, to General Aniline Works, Inc., N. Y. City.

Production disazo dyestuffs. No. 2,031,426. Georg Niemann, Ludwigshafen-am-Rhine, Germany, to General Aniline Works, Inc., N. Y. City.

Method obtaining resist effects with azo dyestuffs. No. 2,031,546. Charles Schwabe Parker, Charles Leonard Wall, and Franklin Farrington, Bolton, England.

Explosives

Production antiparasitic agent to be mixed with explosive charge in gun cartridge. No. 2,028,217. Otto V. Huffman, Bedford Hills, N. Y.

Production propellant powder by treating ungelatinized nitro-cellulose powder grain with a gelatinizer. No. 2,028,990. Fredrich Olsen, Alton, Ill., to Western Cartridge Co., East Alton, Ill.

Stabilization of modified black powder composition by addition of solid organic basic compound. No. 2,030,096. Clarence W. Brooks, Jr., Woodbury, N. J., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Blasting assembly comprising blasting charge and a tamping charge of solid carbon dioxide. No. 2,031,084. Vernon Harcourt Williams, Ardrossan, Scotland, to Imperial Chemical Industries Ltd., a corp. of Great Britain.

Nitroglycerine container for explosives. No. 2,031,505. Carey O. Rison, Oklahoma City, Okla.; one-half to Indian Territory Illuminating Oil Co., Bartlesville, Okla.

Fine Chemicals

Production pure benzoyl persulfide by reacting benzoyl chloride with aqueous sodium hydrogen sulfide. No. 2,028,246. Theodore H. Rider and Robert Shelton, Mariemont, Ohio, to The Wm. S. Merrell Co., Cincinnati, Ohio.

Production ethers containing at least 8 carbon atoms per molecule. No. 2,028,654. Eberhard Elbel, to Henkel & Cie G. m. b. H., both of Dusseldorf, Germany.

Production polyhydric alcohol-polybasic acid-monobasic aliphatic acid anhydride condensation product. No. 2,028,908. Gilbert F. Hoffmann, Milwaukee, Wis., to Pittsburgh Plate Glass Co., a corp. of Pa.

Production sulfonic acids by reacting alkyl disulfonic acid radicals with alcoholic hydroxyl groups. No. 2,029,073. Richard Huttenlocher and Richard Hess, Frankfort-am-Main, Germany.

Production sulfonated higher unsaturated carboxylic esters of polyhydroxy substances. No. 2,029,168. Benjamin R. Harris, Chicago.

Production levulinic acid esters. No. 2,029,412. Gerald J. Cox and Mary L. Dodds, Pittsburgh, Pa., to Niacet Chemicals Corp., N. Y. City.

Production alkenol-aryl hydroxy condensation product. No. 2,029,539. Joseph B. Niederl, N. Y. City.

Production secondary aromatic amines by causing condensation of a salt of phenol and a primary aromatic amine. No. 2,029,642. Waldo L. Semon, Silver Lake Village, Ohio, to The B. F. Goodrich Co., N. Y. City.

Production aliphatic ester of a carboxylic acid. No. 2,029,694. William J. Bannister to Commercial Solvents Corp., both of Terre Haute, Ind.

Production organic tellurium compounds. No. 2,030,035. Melvin A. Perkins, Milwaukee, Wis., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production alkyl resorcinols. No. 2,030,423. William E. Austin, N. Y. City, to Bank of The Manhattan Co.

Production anhydrous citric acid from aqueous acid. No. 2,030,619. Emil Aeckerle Germany, to firm Chemische Fabrick Joh. A. Benckiser G. m. b. H., both of Ludwigshafen-am-Rhine, Germany.

Treatment to render cresylic acid color stable to light, using about 2% maleic anhydride. No. 2,030,690. Charles Raymond Downs, Old Greenwich, Conn., and Robert Paul Weiss, N. Y. City, to Weiss and Downs, Inc., N. Y. City.

Production organic esters by reacting lower dialkyl ether with aliphatic lower monocarboxylic acid in presence strong, non-volatile acid. No. 2,030,835. Henry L. Cox, South Charleston, and Paul S. Greer, Charleston, W. Va., to Union Carbide & Carbon Corp., a corp. of N. Y.

Process depolymerizing alpha substituted acrylic acid esters. No. 2,030,901. Daniel E. Strain to Du Pont Viscoloid Co., both of Wilmington, Del.

Production calcium salts of substituted quinoline carboxylic acids. No. 2,030,958. Philip J. Breivogel, Glen Ridge, N. J.

Production benzimidazole compounds. No. 2,031,037. Charles Graenacher, Basel, and Franz Ackermann, Binningen, near Basel, Switzerland, to Society of Chemical Industry in Basle, Basel, Switzerland.

Production polyvalent metal salt of antimonyl polyhydroxymonocarboxylic acid. No. 2,031,268. Walter Kussmaul to firm Chemical Works formerly Sandoz, both of Basel, Switzerland.

Production high molecular aliphatic mercaptans by treating didodecyl disulfide with NaHS. No. 2,031,529. Eberhard Elbel and Alfred Kirstahler to Henkel & Cie., G. m. b. H., all of Dusseldorf, Germany.

Glass and Ceramics

Production cement from lime bearing materials. No. 2,028,313. Charles H. Breerwood, Narberth, Pa., to Valley Forge Cement Co., a corp. of Pa.

Production arsenate cement mixture. No. 2,028,420. Johan Bertil Stalhane to Bolidens Gruvaktiebolag, both of Stockholm, Sweden.

Decalcification of magnesium dolomites. No. 2,028,639. Clyde Douglas Wygal, Manistique, Mich., to Inland Lime & Stone Co., a corp. of Mich.

Production permanent hard surface Portland cement. No. 2,028,956. Arthur L. Smyly, Chicago.

Production antifrost glass comprising main and secondary panels. No. 2,029,218. John F. Biesik, Milwaukee, Wis.

Production uncrushed crystalline abrasives. No. 2,029,253. Charles R. Walker to Abrasive Products, Inc., both of South Braintree, Mass.

Production basic refractory material. No. 2,029,627. Richard L. Lloyd, Great Neck, N. Y., and Reed W. Hyde, Summit, N. J., to Dwight & Lloyd Metallurgical Co., N. Y. City.

Production highly refractory products. No. 2,029,773. Ture Robert Haglund, Stockholm, Sweden.

Production laminated glass using intermediate sheet and coating of cellulose esters. No. 2,029,931. James G. McNally to Eastman Kodak Co., both of Rochester, N. Y.

Production of magnesium-barium-calcium cement. No. 2,030,002. Arnold Hermann, Sharpsburg, Pa.

Production sodium resistant glass. No. 2,030,389. Louis Navias, Schenectady, N. Y., to General Electric Co., a corp. of N. Y.

Use of a borosilicate glass containing small amount barium oxide. No. 2,030,390. Louis Navias, Schenectady, N. Y., to General Electric Co., a corp. of N. Y.

Production of concrete composition. No. 2,030,518. Francis Walter Guibert, Beverly Hills, Cal.

Production of safety glass using a gelatin base composition. No. 2,030,-607. Walter Pegler, Parramatta, New South Wales, to Joseph Leslie Pegler, Beecroft, New South Wales, Australia.

Production glass resistant to alkali metal vapors. No. 2,030,714. Marcello Pirani, Berlin-Wilmersdorf, and Georg Gaides, Berlin-Pankow, Germany, to General Electric Co., a corp. of N. Y.

Production mastic flooring composition comprising dead-burnt anhydrous gypsum cement and bituminous emulsion. No. 2,031,171. Harry K. Linzell, Oak Park, Ill., to U. S. Gypsum Co., Chicago.

Industrial Chemicals, etc.

Process for sulfating olefines by treating in liquid phase with aqueous sulfuric. No. 2,028,226. Robert F. Le Baron, N. Y. City, to Standard Alcohol Co., Wilmington, Del.

Production ketones by reacting aliphatic secondary alcohol vapors in presence metal catalyst. No. 2,028,267. Francis M. Archibald and Clayton M. Beamer, Elizabeth, N. J., to Standard Alcohol Co., a corp. of Del.

Production organic disulfides by subjecting mercaptans to limited oxidation. No. 2,028,303. Luther B. Turner, Elizabeth, N. J., to Standard Oil Development Co., a corp. of Del.

Production ceresin from ozokerite. No. 2,028,307. Peter J. Wiezevich, Elizabeth, N. J., to Standard Oil Development Co., a corp. of Del.

Chlorination of phthalic anhydride using elemental chlorine and iron salt of strong mineral acid as catalyst. No. 2,028,383. Michael N. Dvornikoff to Monsanto Chemical Co., both of St. Louis, Mo.

Production concentrated nitric acid from water, dilute acid, nitrogen oxides, and oxygen. No. 2,028,402. Emil Luscher to Lonza Elektrizitatswerke und Chemische Fabriken Aktiengesellschaft (Gampel), both of Basel, Switzerland.

Production sulfuric acid from sulfur trioxide. No. 2,028,416. Charles Forbes Silsby, White Plains, N. Y., to General Chemical Co., N. Y. City.

Production fluorescent substance. No. 2,028,472. Hans Rabe, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfort-am-Main, Germany.

Production sulfur dispersion containing water and condensation product of aldehyde and sulfonic acid. No. 2,028,482. George R. Tucker, North Andover, Mass., to Dewey & Almy Chemical Co., North Cambridge, Mass.

Production phosphates using chromic acid to oxidize discoloring impurities. No. 2,028,632. George E. Taylor, Westfield, N. J., to General Chemical Co., N. Y. City.

Production sulfur dioxide from acid sludge. No. 2,028,713. Frank J. Bartholomew, Westfield, N. J., to Chemical Construction Corp., N. Y. City.

Production sulfur dioxide from acid sludge. No. 2,028,725. James M. Rumple, St. Louis, Mo., to Chemical Construction Corp., N. Y. City.

Contact process for sulfuric production. No. 2,028,733. Cyril B. Clark, Scarsdale, N. Y., to American Cyanamid Co., N. Y. City.

Contact process for sulfuric manufacture. No. 2,028,739. Cyril B. Clark, Scarsdale, N. Y., to American Cyanamid & Chemical Corp., a corp. of Del.

Recovery of coal from coal and water pulp by froth flotation, using an organic flotation agent. No. 2,028,742. Philip M. Frantz, Pueblo, Colo., to The Colorado Fuel & Iron Co., Denver, Colo.

Production formic acid by reacting carbon monoxide and water in presence of stable carboxylic acid. No. 2,028,764. Henry Dreyfus, London, England.
Production formic acid by reacting carbon monoxide and water in presence copper sulfate. No. 2,028,765. Henry Dreyfus, London, England.
Process for concentrating acetic acid. No. 2,028,800. Donald F. Othmer to Eastman Kodak Co., both of Rochester, N. Y.
Process concentrating acetic acid. No. 2,028,801. Donald F. Othmer, Brooklyn, N. Y.
Purification of caustic soda solutions by addition of sodium sulfate. No. 2,028,898. Raymon E. Vander Cook, Inkster, and Alexander M. Lawson, Trenton, Mich., to Penn. Salt Mfg. Co., Philadelphia.
Production carrier web for formation of thin, transparent films. No. 2,028,936. Edouard M. Kratz, Gary, Ind., and Erich Gebauer-Fuelnegg, Evansville, Ill., to Marbo Products Corp., Chicago.
Separation of acetylene from gas mixtures of unsaturated hydrocarbons. No. 2,029,120. Heinrich Schilling, Ludwigshafen-am-Rhine, and Robert Stadler, Ziegelhausen-am-Neckar, Germany, to I. G., Frankfort-am-Main, Germany.
Removal of hydrogen sulfide and ammonia from gases by washing with thionate solution. No. 2,029,262. Christian Johannes Hansen, Essen-Ruhr, Germany, to The Koppers Co. of Del., Pittsburgh, Pa.
Method of concentrating nitric acid. No. 19,837—reissue. Ingenuin Hechenbleikner, deceased, late of Charlotte, N. C., by Chemical Construction Corp., N. Y. City, the assignee.
Production tetra alkyl lead by reacting an organic halide with a lead mono-sodium alloy. No. 2,029,301. Louis S. Bake, Pennsgrove, N. J., to E. I. du Pont de Nemours & Co., Wilmington, Del.
Preparation of phosphorus reduction furnace charging stock. No. 2,029,309. Harry A. Curtis, Knoxville, Tenn., and Armand J. Abrams, Colbert County, near Sheffield, Ala., to T. V. A., Inc., Wilson Dam., Ala.
Regeneration of absorbent liquids such as ammoniacal cuprous solutions. No. 2,029,411. Axel Christensen, Rye, N. Y., to Chemical Construction Corp., a corp. of Del.
Distillation of ammonia from aqueous ammoniacal brines. No. 2,029,-467. George Gerald Day, North Holston, Va., to The Mathieson Alkali Works, Inc., N. Y. City.
Contact process for sulfuric production. No. 2,029,530. Alphons O. Jaeger, Mount Lebanon, Pa., to American Cyanamid & Chemical Corp., a corp. of Del.
Contact process for production sulfuric acid. No. 2,029,531. Alphons O. Jaeger, Mount Lebanon, Pa., to American Cyanamid & Chemical Corp., a corp. of Del.
Method crystallizing dextrose solutions. No. 2,029,560. Charles J. Copland, North Kansas City, Mo., to International Patents Development Co., Wilmington, Del.
Production alkali sulfite or bisulfite from waste liquors obtained in digestion of cellulose with alkali sulfur compounds. No. 2,029,616. Gustaf Haglund to Patentaktiebolaget Grondal-Ramen, both of Stockholm, Sweden.
Purification of non-tertiary alcohols using the Friedel-Crafts reaction. No. 2,029,618. Heinrich Hopff, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfort-am-Main, Germany.
Process subjecting mixture of potassium nitrate and ammonium chloride to extraction with anhydrous ammonium nitrate and liquid ammonia. No. 2,209,623. Carl Kircher and Fritz Mueller, Ludwigshafen-am-Rhine, and Hermann Suessenguth, Mannheim, Germany, to I. G., Frankfort-am-Main, Germany.
Process for removal of phosphorus from dilute blast furnace gases. No. 2,029,663. Friedrich P. Kerschbaum, Frankfort-am-Main, Germany, William H. Waggaman, Baltimore, Md., and Stapleton D. Gooch, Pembroke, Fla., to Pembroke Chemical Corp., a corp. of Fla.
Method refining edible fats and oils. No. 2,029,722. Vernon Jersey to S. M. A. Corp., both of Cleveland.
Production alkali nitrate by reacting ammonium nitrate with alkali chloride in aqueous solution. No. 2,029,738. Philipp Osswald, Hofheim, and Walter Geisler, Frankfort-am-Main-Hochst, to I. G., Frankfort-am-Main, Germany.
Method of dehydrating aqueous solutions. No. 2,029,826. Alexander Douglas Macallum, Niagara Falls, N. Y., to E. I. du Pont de Nemours & Co., a corp. of Del.
Production carburetted water gas. No. 2,029,850. Leslie Alvin Angus, Owosso, Mich., to Semet-Solvay Engineering Corp., N. Y. City.
Process for hydrogenizing and/or splitting of coal, tars, mineral oils, etc. No. 2,029,895. Wilhelm Rittmeister, Dessau/Anhalt, Germany, to E. I. du Pont de Nemours & Co., Wilmington, Del.
Production sulfur dioxide. No. 2,030,021. Harold O. C. Ingraham, Greenwich, Conn., to General Chemical Co., N. Y. City.
Production oxygenated organics by reacting carbon monoxide with an alcohol in presence silica-phosphoric acid catalyst. No. 2,030,048. Ralph Lyman Brown, Syracuse, N. Y., to Atmospheric Nitrogen Corp., N. Y. City.
Production potassium carbonate by treating potassium sulfate with CO in presence of water and caustic lime. No. 2,030,082. Erich Wiedbrauck and Karl Buche to firm Th. Goldschmit A.-G., both of Essen-Ruhr, Germany.
Stabilization of aqueous dispersions. No. 2,030,222. Edwin B. Newton, Akron, Ohio, to The B. F. Goodrich Co., N. Y. City.
Production homogeneous fluid dispersion of casein and a cellulose ether. No. 2,030,226. Donald A. Rankin and Frank G. Uhler, Newburgh, N. Y., to E. I. du Pont de Nemours and Co., Wilmington, Del.
Production of metallic agglomerated structural material. No. 2,030,229. Paul Schwarzkopf, Reutte-Tyrol, Austria.
Method of treating vermiculite material using alkaline earth metal salts. No. 2,030,239. William Berthier Byers, Kansas City, Mo.
Purification of zinc chloride containing an ammonium salt impurity by use of nitric acid. No. 2,030,273. George Stevens Simpson, Plainfield, N. J., to General Chemical Co., N. Y. City.
Catalyst for methane-steam reaction comprising palladium, magnesium oxide, and a cerium oxide. No. 2,030,283. Frank J. De Rewal, Camillus, N. Y., to Atmospheric Nitrogen Corp., N. Y. City.
Process avoiding setting phenomena in commercially prepared salts. No. 2,030,583. Julius Haas, Kassel-Wilhelmshohe, and Gustav Adolf, Stockhausen, Germany, to Wintershall Aktiengesellschaft, Kassel, Germany.
Production magnetic iron oxide and sulfur dioxide from iron sulfide ores. No. 2,030,627. Horace Freeman, Shawinigan Falls, Quebec, Canada, to Nichols Engineering & Research Corp. of Canada, Ltd., a corp. of Canada.
Production soluble barium and strontium salts by treating the sulfates. No. 2,030,659. Randolph Norris Shreve and William N. Pritchard, Jr., West Lafayette, Ind., Henry V. Farr, Ferguson, Arthur John Still, St. Louis, Mo., and John D. Crosby, Arlington, N. J., to Mallinckrodt Chemical Works, St. Louis, Mo.
Purification of caustic liquor using strontium sulfate. No. 2,030,694. Harvey G. Elledge and Alfred Hirsch to Diamond Alkali Co., all of Painesville, Ohio.
Method of vapor phase catalytic oxidation. No. 2,030,800. Riewen Riegler, Buffalo, N. Y., to National Aniline & Chemical Co., Inc., N. Y. City.
Production ammonium salts from ammonia and the corresponding acid. No. 2,030,811. Russell E. Cushing, Haddonfield, N. J., to Penn Salt Mfg. Co., Philadelphia.
Production chlorine dioxide by treatment of magnesium chloride. No. 19,849—reissue. George Lewis Cunningham, Niagara Falls, N. Y., to The Mathieson Alkali Works, Inc., N. Y. City.
Production sodium and zinc sulfides. No. 2,030,887. Thomas A. Mitchell, Inglewood, and Royal L. Sessions, Los Angeles, Cal., to Hughes-Mitchell Processes, Inc., Denver, Colo.
Method making shaped bodies of non-plastic metallic oxides. No. 2,031,-129. Reinhold Reichmann, Berlin, Germany, to Siemens & Halske, Akteingesellschaft, Siemensstadt, near Berlin, Germany.
Method evaporating aqueous hydrochloric acid using copper apparatus in presence phosphoric acid. No. 2,031,179. Klaus Raschig to Dr. F. Raschig G. m. b. H., both of Ludwigshafen-am-Rhine, Germany.
Production water soluble barium salts and hydrogen peroxide by decomposing barium peroxide with aqueous phosphoric acid. No. 2,031,180. Friedrich Rusberg, Berlin-Niederschoneweide, Germany, to Kali-Chemie Aktiengesellschaft, Berlin, Germany.
Production aliphatic aldehyde products. No. 2,031,200. Karl Baur, Ludwigshafen-am-Rhine, Germany, to Union Carbide & Carbon Corp., a corp. of N. Y.
Production alkyl halides by passing olefine and hydrogen halide into anhydrous alkyl halosulfonate. No. 2,031,228. John H. Reilly to The Dow Chemical Co., both of Midland, Mich.
Treatment of organic cellular materials. No. 2,031,243. Eduard Julius Worf, Hamburg, Germany.
Method treating anode copper mud by using iron sulfate in presence of air. No. 2,031,299. Jesse O. Betterton and George H. Weis, Metuchen, N. J., to American Smelting & Refining Co., N. Y. City.
Production sulfur dioxide by burning sprayed molten sulfur and oxygen. No. 2,041,403. Isaac Bencowitz, N. Y. City, to Texas Gulf Sulphur Co., a corp. of Texas.
Purification of gas from nitrogen oxide by contact with metallic sulfides. No. 2,031,410. Walter H. Fulweiler, Wallingford, Pa., to The United Gas Improvement Co., Philadelphia.
Method of continuously oxidizing carbon monoxide by passing with oxygen over copper chromite catalyst. No. 2,031,475. Joseph C. W. Frazer, Baltimore, Md.
Production of sulfur dioxide from pyrites. No. 2,031,504. Brodde E. F. Rhodin, Caldwell, N. J.; one-half to Albert Harry Chitty, Sault Ste. Marie, Ontario, Canada, and one-half to David Munroe, Belleville, N. J.
Recovery of gases and dust evolved in electrolytic production of aluminum. No. 2,031,554. Pierre Jean Michel Torchet, St. Jean de Marienne, France, to "Compagnie de Produits Chimiques et Electrometallurgiques Alais, Froges et Camargue," Paris, France.
Production manganese phosphates. No. 2,031,579. Charles F. Booth, Anniston, Ala., to Swann Research, Inc., a corp. of Ala.

Leather and Tanning

Tanning process comprising treatment of hides and skins with aldehyde, aluminum salt, and a synthetic organic tanning agent. No. 2,029,088. Harold G. Turley, Moorestown, N. J., and Ian C. Somerville, Fox Chase, Pa., to Rohm & Haas Co., Philadelphia.
Method protecting animal tissue from oxidative deterioration by dusting with mixture of 50% salt and 50% vegetable substance. No. 2,029,-248. Sidney Musher, N. Y. City.
Production synthetic tanning agent of the sulfonated diarylmethane type. No. 2,029,322. Alphons O. Jaeger, Greentree, Pa., to American Cyanamid & Chemical Corp., N. Y. City.

Metals, Alloys, Ores

Method electroplating aluminum using preliminary treatment with basic aluminum chloride. No. 2,028,312. Oscar Bornhauser, Strasbourg, France, to Societe d'Electrochimie, d'Electrometallurgie et des Acieries Electriques d'Ugine, Paris, France.
Welding rod alloy comprising copper, nickel, silicon, and zinc. No. 2,028,317. Homer W. Butterbaugh, Kenosha, Wis., to The American Brass Co., Waterbury, Conn.
Method of protecting magnesium or its alloys from corrosion using polyhydric alcohol and an alkali fluoride. No. 2,028,343. Josef Martin Michel, Bitterfeld, Germany, to Magnesium Development Corp., a corp. of Del.
Production of alkali metals. No. 2,028,390. Miles G. Hanson, Flint, Mich.
Production thin tungsten carbide castings. No. 2,028,911. Orrin F. Marvin to Mills Alloys, Inc., both of Los Angeles, Cal.
Recovery of precious metals from ores or concentrates by mixing with sodium or potassium carbonate or nitrate. No. 2,028,940. George James MacKay, Kingston, Ontario, Canada.
Flotation method for concentrating oxidized ores using sodium mercaptobenzothiazole, phosphoric acid, and a frother. No. 2,029,156. Ludwig J. Christmann, Jersey City, and Stuart A. Falconer, Elizabeth, N. J., to American Cyanamid Co., N. Y. City.
Preparation of vanadium catalyst using finely divided carrier, organic gum, and a solution of a vanadium compound. No. 2,029,376. Henry Joseph, Rosedale, N. Y., to General Chemical Co., N. Y. City.
Method of electrolytically depositing metals. No. 2,029,386. Paul R. Pine to The Harshaw Chemical Co., both of Elyria, Ohio.
Method of metallic electro-deposition. No. 2,029,387. Paul R. Pine to The Harshaw Chemical Co., both of Elyria, Ohio.
Production steel having nitrided surface layer and containing small percentage beryllium. No. 2,029,724. Wilhelm Kroll, Luxemburg, Luxemburg.
Method improving the ductility of rolling magnesium alloys. No. 2,029,728. Robert D. Lowry and Fred L. Reynolds to The Dow Chemical Co., all of Midland, Mich.
Preparation nickel catalyst by mixing nickel oxide with a silicon ester. No. 2,029,786. William Whalley Myddleton, Hanworth, England, to Robinson Bindley Processes Ltd., Sutton, England.
Method treating an electric arc welded chrome alloy steel container. No. 2,029,807. Harry S. Blumberg to M. W. Kellogg Co., both of N. Y. City.

Production cast steel wheel comprising alloy of carbon, manganese, molybdenum, chromium, silicon, and iron, with phosphorus and sulfur as impurities. No. 2,029,819. Alfred W. Gregg and Raymond H. Frank to The Bonney-Floyd Co., all of Columbus, Ohio.

Removal of iron impurities from magnesium. No. 2,029,898. Walther Schmidt and Adolf Beck, Bitterfeld, Germany, to Magnesium Development Corp., a corp. of Del.

Recovery of sodium from sodium-calcium-non-metallic substances mixture. No. 2,029,998. Harvey N. Gilbert, Niagara Falls, N. Y., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production alloy containing nickel, cobalt, iron, and titanium. No. 2,030,112. Erwin F. Lowry, Forest Hills, Pa., to Westinghouse Electric & Mfg. Co., a corp. of Pa.

Production of alloy containing carbon, chromium, vanadium, tungsten, boron, and cobalt. No. 2,030,342. William A. Wissler, Flushing, N. Y., to Union Carbide & Carbon Corp., a corp. of N. Y.

Alloy containing carbon, chromium, either tungsten or molybdenum, vanadium, and cobalt. No. 2,030,343. William A. Wissler, Niagara Falls, N. Y., to Union Carbide & Carbon Corp., a corp. of N. Y.

Use of silicon to remove tin from columbium alloys. No. 2,030,357. Ernest F. Doom, Niagara Falls, N. Y., to Union Carbide & Carbon Corp., a corp. of N. Y.

Removal of iron from raw materials using cyanide, water, and an alkaline reagent. No. 2,030,372. Gustav Jaeger, Neu-Isenburg, Germany, to Deutsche Gold und Silber Scheideanstalt vormals Roessler, Frankfort-am-Main, Germany.

Concentration of precious metal ores by froth flotation using a metallic sulfo compound. No. 2,030,526. Carl Gottfried Rudolf Melzer, Langenberg, Germany.

Production of metallic barium for electrical use. No. 2,030,670. Erich Wiegand, Berlin-Waidmannslust, Germany, to General Electric Co., a corp. of N. Y.

Heat treatment to improve physico-mechanical properties of magnesium alloys. No. 2,030,767. Walther Schmidt, Paul Spitaler, and Werner Schultze, Bitterfeld, Germany, to Magnesium Development Corp., a corp. of Del.

Method removing iron and ncikel from oxide ores as volatile chlorides. No. 2,030,867. Charles Hart, Chester, Pa.; one-half to Peter Shields, Washington, D. C.

Separation from ores of chromium, iron and nickel as volatile chlorides. No. 2,030,868. Charles Hart, Chester, Pa.; one-half to Peter Shields, Washington, D. C.

Production copper-beryllium alloys containing also titanium. No. 2,030,921. Werner Hessenbruch to Heraeus-Vacuumschmelze, A. G., both of Hanau-am-Main, Germany.

Production alloy containing silver, beryllium and copper. No. 2,031,113. Robert H. Leach, Fairfield, Conn., to Handy & Harman, N. Y. City.

Production alloys of iron, chromium, nickel and copper. No. 2,031,152. Alexander L. Field to Rustless Iron & Steel Corp. of America, both of Baltimore, Md.

Production alloy containing copper, silicon, nickel, aluminum and iron. No. 2,031,315. Herbert C. Jennison, Bridgeport, Conn., to The American Brass Co., Waterbury, Conn.

Production alloy containing copper, silicon, nickel, aluminum, iron and tin. No. 2,031,316. Herbert C. Jennison, Bridgeport, Conn., to The American Brass Co., Waterbury, Conn.

Quenching oils for metal working. No. 2,031,431. George Chapelton Shepherd, Jr., Long Beach, Cal., to Union Oil Co. of Cal., Los Angeles.

Production alloys of alkaline earth metals with lead or other metals. No. 2,031,486. Gustaf Newton Kirsebom, Oslo, Norway, to Calloy Ltd., London, England.

Production alloys of alkaline earth metals with cadmium. No. 2,031,487. Gustaf Newton Kirsebom, Oslo, Norway, to Calloy Ltd., London, England.

Production oxygen-free copper of high electrical conductivity. No. 2,031,518. Hermann von Forster and Fritz Kunstel, Frankfort-am-Main, Germany, to American Lurgi Corp., N. Y. City.

Production of metal castings. No. 2,031,538. Paul C. Lemmerman, Cleveland Heights, Ohio, to The Grasselli Chemical Co., Cleveland.

Naval Stores

Catalytic oxidation of turpentine oils. No. 2,030,802. Walther Schrauth, Berlin-Dahlem, Germany, to Deutsche Hydrierwerke Aktiengesellschaft, Berlin-Charlottenburg, Germany.

Paper and Pulp

Production cellulose pulp for esterification purposes. No. 2,028,846. George A. Richter to Brown Co., both of Berlin, N. H.

Production colored photographs in natural colors on papers, films, etc. No. 2,029,077. Franz Lejeune, Vienna, Austria.

Production waterproofed plastic paper. No. 2,029,390. Earle V. Rodgers, Kenilworth, N. J.

Production paper carrying a resin and plasticizer to render it transparent. No. 2,029,525. Carleton Ellis, Montclair, N. J., to Ellis-Foster Co., a corp. of N. J.

Process making paper pulp. No. 2,029,973. Sidney D. Wells, Combined Locks, Wis.; one-half to Gerald D. Muggleton, Appleton, Wis.

Production of bleached pulp. No. 2,030,382. Richard A. Nugent, Nekoosa, and Arno J. Luth and Neil H. Christian, Port Edwards, Wis., to Nekoosa-Edwards Paper Co., Port Edwards, Wis.

Method of treating pulp. No. 2,030,383. Richard A. Nugent, Nekoosa, and Arno J. Luth and Neil H. Christian, Port Edwards, Wis., to Nekoosa-Edwards Paper Co., Port Edwards, Wis.

Alkaline bleaching of paper pulp. No. 2,030,384. Richard A. Nugent, Nekoosa, and Arno J. Luth and Neil H. Christian, Port Edwards, Wis., to Nekoosa-Edwards Paper Co., Port Edwards, Wis.

Use of sulfuric acid solutions in production of parchment papers. No. 2,030,469. George A. Richter to Brown Co., both of Berlin, N. H.

Production fibrous products from fibrous waste material. No. 2,030,626. George H. Ellis, St. Paul, Minn., to The Insulite Co., Minneapolis, Minn.

Method of fireproofing fibre board using stock solution of monoammonium phosphate and boric acid. No. 2,030,653. Robert G. Quinn, Glens Falls, N. Y., to International Paper Co., N. Y. City.

Process making paper pulp from sugarcane bagasse. No. 2,031,239. Alfred M. Thomsen, San Francisco.

Process of bleaching cellulosic pulp material. No. 2,031,485. Hans John and Clarence C. Le Febvre, Appleton, and Horace Du Bois, Neenah, Wis., to Paper Patents Co., Neenah, Wis.

Petroleum Chemicals

Process separating components of acid sludge by contacting with an oxygenated organic solvent. No. 2,028,185. John C. Bird, Elizabeth, N. J., to Standard Oil Development Co., a corp. of Del.

Production highly refined mineral oil composition containing dibenzyl sulfide and a sulfide of the cresol type. No. 2,028,257. Bertrand W. Story, Paulsboro, and Everett W. Fuller, Woodbury, N. J., to Socony-Vacuum Corp., N. Y. City.

Production hydrocarbon fuel suitable for use in Diesel engines. No. 2,028,308. Wilhelm Wilke, Mannheim, Robert Stadler, Ziegelhausen, and Franz Lappe, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfort-am-Main, Germany.

Process desulfurizing a petroleum oil distillate. No. 2,028,335. Vladimir Kalichevsky, Elizabeth, N. J., to Standard Oil Development Co., a corp. of Del.

Process hydrogenating distillable carbonaceous materials. No. 2,028,348. Mathias Pier, Heidelberg, and Walter Kroenig, Ludwigshafen-am-Rhine, Germany, to Standard-I. G. Co., Linden, N. J.

Process revivifying used water solutions of heavy metal salts following use in hydrocarbon oil refining. No. 2,028,473. Paul C. Rich to Vapor Treating Processes, Inc., both of Los Angeles, Cal.

Continuous, non-catalytic polymerization of unsaturated hydrocarbons. No. 2,028,886. Cary R. Wagner to The Pure Oil Co., both of Chicago.

Production asphalt by oxidizing mixture of distillation residuum and an oily distillate cylinder stock. No. 2,028,922. Bernard L. Rose to The Standard Oil Co., both of Cleveland, Ohio.

Method desulfurizing petroleum oils. No. 2,028,995. Francis M. Rogers to Standard Oil Co., both of Whiting, Ind.

Method sweetening mercaptan-bearing hydrocarbon oils. No. 2,028,998. Walter A. Schulze and Lovell V. Chaney to Phillips Petroleum Co., all of Bartlesville, Okla.

Refining sulfur-containing hydrocarbon oil by treating with hydrogen in presence pre-formed thio compound. No. 2,029,100. Aristid V. Grosse to Universal Oil Products Co., both of Chicago.

Use of sulfuric acid and a sulfonated hydrocarbon in refining of light petroleum distillates by vapor phase methods. No. 2,029,115. Jacque C. Morrell to Universal Oil Products Co., both of Chicago.

Process refining hydrocarbon oils using aqueous hydrogen chloride in presence natural zinc-bearing clay. No. 2,029,256. Roland B. Day to Universal Oil Products Co., both of Chicago.

Production asphalt-asbestos mastic. No. 2,029,289. Ulric B. Bray, Palos Verdes Estates, Lawton B. Beckwith, San Pedro, and Frederick S. Scott, Los Angeles, Cal., to Union Oil Co. of Cal., Los Angeles.

Production asphalts from asphaltic residual oil. No. 2,029,290. Ulric B. Bray, Palos Verdes Estates, and Lawton B. Beckwith, San Pedro, Cal., to Union Oil Co. of Cal., Los Angeles.

Production high molecular weight compounds from petroleum oil. No. 2,029,382. David R. Merrill, Long Beach, Cal., to Union Oil Co. of Cal., Los Angeles.

Production oxidized asphalts. No. 2,029,504. Edward G. Ragatz to Union Oil Co. of Cal., both of Los Angeles.

Purification of oily liquid partial oxidation products containing oxygen derivatives of aliphatic hydrocarbons, product being of lubricant type. No. 2,029,619. Joseph Hidy James, Pittsburgh, Pa., to Clarence P. Byrnes, trustee.

Use of carbon dioxide in selectively shutting off water flow in an oil well. No. 2,029,649. Eugene E. Ayres, Pittsburgh, Pa., to Gulf Research & Development Corp., Wilmington, Del.

Process for sulfur and gum removal from gasoline by treating with ammonium chloride in presence of zinc. No. 2,029,757. Roland B. Day, Palos Verdes Estates, Cal., to Universal Oil Products Co., Chicago.

Use of hydrochloric and sulfuric in treatment of hydrocarbon oils. No. 2,029,758. Roland B. Day to Universal Oil Products Co., both of Chicago.

Removal of gum and color forming impurities from cracked hydrocarbons using sulfuric and phosphoric. No. 2,029,785. Jacque C. Morrell to Universal Oil Products Co., both of Chicago.

Method treating cracked petroleum distillates with organic reagents. No. 2,030,033. Elliot B. McConnell, Cleveland Heights, Ohio, to The Standard Oil Co., Cleveland, Ohio.

Production acetylene and liquid hydrocarbons from hydrocarbon gases. No. 2,030,070. Jacque C. Morrell to Universal Oil Products Co., both of Chicago.

Use of aqueous lime suspension in liquid mineral oil treatment. No. 2,030,245. Ralph Hoagland Crosby, Hammond, and Bernard Richard Carney, East Chicago, Ind.

Solvent recovery in oil extraction processes. No. 2,030,284. Sterling H. Diggs, Caspar, Wyo., to Standard Oil Co., Chicago.

Production pour point depressors comprising organic condensation products. No. 2,030,307. Frederick H. MacLaren, Calumet City, Ill., to Standard Oil Co., Chicago.

Process for reclaiming oil containing carbon. No. 2,030,480. George J. Strezynski, Poughkeepsie, N. Y., to The De Laval Separator Co., N. Y. City.

Use of silcate of soda and water in renovating journal box waste oil. No. 2,030,577. Leonard T. Evans, Indianapolis, Ind.

Production synthetic lubricating oils. No. 2,030,832. Frederick H. MacLaren, Calumet City, Ill., to Standard Oil Co., Chicago.

Use of a furoic ester in hydrocarbon oil treatment. No. 2,030,870. Lawrence M. Henderson, Narbeth, Pa., to The Atlantic Refining Co., Philadelphia.

Production motor fuel product containing an aromatic amino azo compound as gum inhibitor. No. 2,030,940. Thomas H. Rogers and Vanderveer Voorhees, Hammond, Ind., to Gasoline Antioxidant Co., Wilmington, Del.

Sheet or film for packaging purposes comprising amorphous petroleum wax sheet carrying a suspended colloid. No. 2,031,036. Carl G. Dreymann, Pittsburgh, Pa., to Grant Paper Box Co., a corp. of Pa.

Use of liquid propane in separating wax from oil. No. 2,031,095. Ulric B. Bray, Palos Verdes Estates, Cal., to Union Oil Co. of Cal., Los Angeles.

Use of chlorinated di- or tri-ethylene compounds in separating wax from oil. No. 2,031,096. Ulric B. Bray, Palos Verdes Estates, Cal., to Union Oil Co. of Cal., Los Angeles.

Use of naphtha to separate asphalt and wax from lubricating oils. No. 2,031,204. Ulric B. Bray, Palos Verdes Estates, Cal., to Union Oil Co. of Cal., Los Angeles.

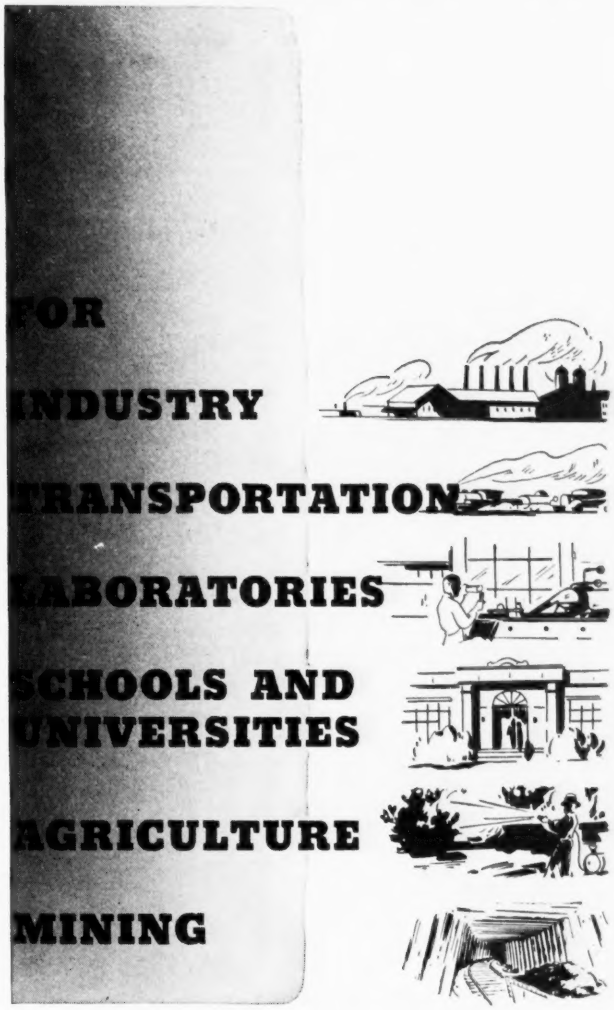
Production petroleum lubricating oils containing an esterified hydroxy stearic acid. No. 2,031,227. Ernest F. Pevere, Beacon, and Clifford G. Ludeman, Fishkill, N. Y., to The Texas Co., N. Y. City.

Production compressed ignition fuel comprising fuel oil and nitrates of aliphatic monohydric alcohols. No. 2,031,497. Carl S. Marvel, Urbana, Ill., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Grasselli chemicals

Which do you use?

Acetate of Lead
Acetic Acid Commercial
Acetic Acid Glacial
Acetic Acid Pure
Acetic Acid Redistilled
Alum—Ammonia U.S.P.
Alum—Filter
Alum—Paper Makers
Alum—Pearl
Alum—Potash U.S.P.
Aluminum Sulphate
  Commercial and Iron Free
Aluminum Chloride Crystals
Aluminum Chloride Solution
Ammonium Nitrate
Ammonium Nitrate, C. P.
Ammonium Sulphate 99.5%
Aqua Ammonia
Aqua Fortis
Arsenic Acid
Barium Carbonate
Barium Chloride
Barium Sulphate—(Blanc Fixe)
Battery Acid
Battery Coppers
Battery Zinc
Bi-Chromate of Soda
Bi-Chromate of Potash
Bi-Sulphate of Soda
Bi-Sulphite of Soda Solution
Bright Zinc
C. P. Ammonium Hydroxide
C. P. Glacial Acetic Acid
C. P. Hydrochloric Acid
C. P. Nitric Acid
C. P. Sulphuric Acid
Cadalyte*
Cadalyte Bright Dip
Cadmium
Cadmium Anodes
Cadmium Hydrate
Cadmium Plating Equipment
Cadmium Sulphide
Calcium Phosphate, Dibasic
Calcium Phosphate, Tribasic
Chromic Acid
Delimer K*
Duclean—Iron drum cleaner
2 Ethyl Hexenal
Fire Retardants
Fixtan A & B
Formic Acid
G. B. S. Soda
Glauber's Salt
Glauber's Salt Anhydrous
Hypo-Sulphite of Soda Crystals
Hypo-Sulphite of Soda Granulated
Hypo-Sulphite of Soda Pea Crys.
Indium—metal or oxide
Inhibitor No. 3—Non-Foaming
Inhibitor No. 8—Foaming
Insecticides and Fungicides
Lactic Acid
Lactic Acid, Edible
Lactic Acid, U.S.P.
Manganese Nitrate
Mixed Acid
Mossy Zinc
Muriate of Tin Crystals
Muriate of Tin Solution
Muriatic Acid
Nitric Acid Commercial
Nitric Acid Engraver's Grade
Nitric Acid Fuming
Nogas
Oleum
Oxalic Acid
Phosphate of Soda
Phosphate of Soda—Anhydrous
Phosphate of Soda—Mono
Potassium Silicate Glass
Potassium Silicate Solution
Sal Ammoniac
Salt Cake
Sherardizing Zinc
Silicate of Soda—Anhydrous
Silicate of Soda Granulated
Silicate of Soda G.4.S.
Silicate of Soda Lump
Silicate of Soda Meta
Silicate of Soda Pulverized
Silicate of Soda "R-B"
Silicate of Soda Solid Glass
Silicate of Soda Solution
Snowflake Soldering Salts
Sodium Pyrophosphate
Sodium Formate
Sodium—Lead Alloy
Sodium—Zinc Alloy
Sodium Silico Fluoride
Soldering Flux Crystals
Soldering Flux Solution
Slab Zinc
Strontium Carbonate
Strontium Nitrate
Sulphate of Soda Anhydrous
Sulphate of Soda Technical
Sulphate of Zinc
Sulphide of Soda Concentrated
Sulphide of Soda Crystals
Sulphide of Soda Flake
Sulphide of Soda Fused Solid
Sulphite of Soda Crystal
Sulphuric Acid
Super Sulphate of Soda
Thallium Sulphate
Titanyl Sulphate
Tin Crystals
Tinning Flux
Tri-Sodium Phosphate
Zinc Anodes
Zinc Chloride Fused
Zinc Chloride Granulated
Zinc Chloride Solution
Zinc Dust—Non Gassing
Zinc Intermediate
Zinc Oxide
  Tomahawk* 35% Leaded
  Snow Cap* 5% leaded
  (*Trade-Mark Reg.)



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Pigments

Production zinc sulfide by cyclic use of sodium chloride and barium sulfate. No. 2,028,162. Thomas A. Mitchell and Royal L. Sessions to Hughes-Mitchell Processes Inc., all of Denver, Colo.

Production and purification of titanium sulfide. No. 2,028,292. Reginald Hill Monk and Archibald Stewart Ross, Montreal, Quebec, Canada, to American Zinc, Lead & Smelting Co., St. Louis, Mo.

Production inorganic colored pigment by combining pure zinc oxide with another divalent metal oxide. No. 2,028,980. Erich Korinth, Frankfort-am-Main-Hochst, and Georg Meder, Munster-in-Taunus, Germany, to I. G. Frankfort-am-Main, Germany.

Production titanium dioxide by hydrolyzing a titanium salt solution in presence of solid alkali titanate. No. 2,029,881. William T. Little, Westfield, N. J., to American Zirconium Corp., Baltimore, Md.

Production red pigments of inorganic nature. No. 2,030,009. Ekbert Lederle, Ludwigshafen-am-Rhine, Germany.

Resins, Plastics, etc.

Production nitrocellulose plastic composition using neutral ester of a dicarboxylic acid and a cyclohexylcyclohexanol residue. No. 2,028,399. Lucas P. Kyrides, Webster Groves, Mo., to Monsanto Chemical Co., a corp. of Del.

Production plastic comprising cellulose acetate mixed with a carboxylic acid neutral ester and an acetal of glycerol and acetaldehyde. No. 2,028,-403. Joseph R. Mares to Monsanto Chemical Co., both of St. Louis, Mo.

Use of vinyl resin on printing plate facings. No. 2,028,712. Hylton Swan, Upper Montclair, and Sigfried Higgins, Verona, N. J., to Bakelite Corp., N. Y. City.

Production soluble artificial resin by reacting polyhydric alcohol ester and a monobasic acid with anhydride of organic dibasic acid. No. 2,028,-914. William A. Noyes, Urbana, Ill., and Gilbert F. Hoffman, Milwaukee, Wis., to Pittsburgh Plate Glass Co., a corp. of Pa.

Production molding material comprising resorcinol, alcohol, and paranitroaniline. No. 2,029,012. Hal T. Beans, Palisade, N. J., and George H. Walden, Jr., and Louis P. Hammett, N. Y. City.

Production soybean phosphatides. No. 2,029,261. Wells W. Ginn to Chemical Novelties Corp., both of Cincinnati, Ohio.

Production petroleum plastic resin. No. 2,029,288. Ulric B. Bray, Palos Verdes Estates, Cal., to Union Oil Co. of Cal., Los Angeles.

Process comprising polymerization of chloro-2-butadiene-1, 3 in presence film-forming material. No. 2,029,410. Wallace H. Carothers, Fairville, Pa., and Arnold M. Collins and James E. Kirby, Wilmington, Del., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production molding composition condensation product of formaldehyde with urea and thiourea. No. 2,029,836. Kurt Ripper, Vienna, Austria.

Production hydrophobe urea-thiourea-formaldehyde condensation products. No. 2,029,893. Kurt Ripper, Vienna, Austria.

Production organic molding composition. No. 2,029,894. Kurt Ripper, Vienna, Austria.

Production synthetic resins of the amine-aldehyde type. No. 2,029,954. Theodor Sutter to Society of Chemical Industry in Basle, both of Basel, Switzerland.

Production embossed plastic material. No. 2,030,066. Henry Jenett, Cumberland, Md., to Celanese Corp. of America, a corp. of Del.

Production urea-formaldehyde resin molding powders. No. 2,030,192. Philip Bickford Watson, N. Y. City, to American Cyanamid Co., a corp. of Maine.

Production plastic masses containing cellulose esters. No. 2,030,221. Richard Muller, Heidelberg, Martin Schenck, Mannheim, and Wilhelm Wirbatz, Mannheim-Waldhof, Germany, to C. F. Boehringer & Soehne G. m. b. H., Mannheim-Waldhof, Germany.

Use of cellulose acetate on laminated sound record. No. 2,030,568. Bozetech C. Bren, Cedar Grove, N. J., to Dupont Viscoloid Co., Wilmington, Del.

Production hard, insecticide proof, synthetic bodies. No. 2,030,625. George H. Ellis, St. Paul, Minn., to The Insulite Co., Minneapolis, Minn.

Production infusible synthetic resins of aniline and formaldehyde. No. 2,031,260. Alphonse Gams, Gustave Widmer, and Karl Frey, Basel, Switzerland, to Ciba Products Corp., Dover, Del.

Production synthetic resin by reacting cuprene, maleic anhydride, and polyhydric alcohol. No. 2,031,481. Caryl P. Haskins, Schenectady, N. Y., to General Electric Co., a corp. of N. Y.

Production resinous amino derivatives. No. 2,031,057. Hermann A. Bruson to The Resinous Products & Chemical Co., Inc., both of Philadelphia, Pa.

Rubber

Method dispersing rubber in concentrated alkali silicate solution. No. 2,028,397. Max H. Kliefoth to C. F. Burgess Labs., Inc., both of Madison, Wis.

Use of rubber and regenerated cellulose as body and facing for printing plate. No. 2,028,709. Hylton Swan, Upper Montclair, and Sigfried Higgins, Verona, N. J., to Bakelite Corp., N. Y. City.

Production film-forming composition comprising chlorinated rubber and an organic sulfur compound. No. 2,029,588. Leo Rosenthal, Leverkusen-Wiesdorf, and Reinhard Hebermehl, Cologne-Deutz, Germany, to I. G., Frankfort-am-Main, Germany.

Production sponge rubber from aqueous rubber dispersion containing borax, a vegetable gum, and a cell-forming agent. No. 2,029,617. Glen S. Hiers, Cynwyd, Pa., to Collins & Aikman Corp., Philadelphia.

Process for softening and de-nerving crude rubber. No. 2,030,191. Ralph Morris Ungar, London, England, to Softened Rubber Ltd., Manchester, England.

Production removable rubber film on surfaces by previous application of a hypochlorite. No. 2,030,729. Parke H. Watkins, Naugatuck, Conn., to U. S. Rubber Co., N. Y. City.

Textile, Rayon

Production fire-resistant textile materials. No. 2,028,715. Ernest R. Hanson, Bloomfield, N. J., to Halowax Corp., N. Y. City.

Method increasing heat resistance of organic cellulose derivative textile materials. No. 2,028,769. George Holland Ellis and Ralph Charles Storey, Spondon, near Derby, England, to Celanese Corp. of America, a corp. of Del.

Use of polymerizing vinyl compounds to make non-metallic surfaces more permeable. No. 2,028,776. Harold Hibbert, Montreal, Quebec, Canada, to Celanese Corp. of America, a corp. of Del.

Process for treating natural gum coating of raw silk previous to its removal. No. 2,029,350. Leo Wallerstein, Thomas Hawley, and Rowland A. Gale to Wallerstein Co., Inc., all of N. Y. City.

Process for printing acetate artificial silk. No. 2,029,568. Wolfgang Jaeck, Basel, and Arthur Schurch, Riehen, near Basel, Switzerland, to firm Society of Chemical Industry in Basle, Basel, Switzerland.

Use of hydrogen peroxide in cotton goods bleaching. No. 2,029,985. James Andrew Clark, Poughkeepsie, N. Y., and Harry Gregory Smolens, Upper Darby, Pa., to Buffalo Electro-Chemical Co., Inc., Tonawanda, N. Y.

Production of pile textile fabrics by impregnating cellulose acetate pile yarns with weak alkali solution. No. 2,030,102. William Alexander Dickie and Alexander Henderson Gentle, Spondon, near Derby, England, to Celanese Corp. of America, a corp. of Del.

Production disilane-rayon. No. 2,030,736. Rudolph S. Bley, Elizabethton, Tenn., to North American Rayon Corp., N. Y. City.

Cellulosic spinning solutions containing aromatic silicon derivatives. No. 2,030,737. Rudolph S. Bley, Elizabethton, Tenn., to North American Rayon Corp., N. Y. City.

Cellulosic spinning solutions containing aliphatic silicon compounds. No. 2,030,738. Rudolph S. Bley, Elizabethton, Tenn., to North American Rayon Corp., N. Y. City.

Production silicon-rayon. No. 2,030,739. Rudolph S. Bley, Elizabethton, Tenn., to North American Rayon Corp., N. Y. City.

Production soft-luster rayon. No. 2,030,740. Rudolph S. Bley, Elizabethton, Tenn., to North American Rayon Corp., N. Y. City.

Production artificial silk in cuprammonium cellulose solution. No. 2,030,985. August Hartmann and Gotthard Bauriedel, Barmen, Germany, to American Bemberg Corp., N. Y. City.

Use of reaction product of alcohols or aldehydes with naphthalene sulfonic acids to prevent bleeding of dyed wool onto undyed wool. No. 2,031,046. Albert Landolt to Society of Chemical Industry in Basle, both of Basel, Switzerland.

Method impregnating prepared textile yarns with rubber-containing liquid. No. 2,031,094. Joseph Brandwood, Southport, England.

Method dressing fabrics using gelatin or albumin, and alkali. No. 2,031,245. Christian Bener, Chur, Switzerland, to Raduner & Co., A.-G., Horn, Switzerland.

Water, Sewage Treatment

Purification of organically polluted waters by passing through diffused air and by use of oxidation catalyzer of metal salt or hydroxide type. No. 2,029,958. Oliver M. Urbain, Columbus, Ohio, to Charles H. Lewis, Harpster, Ohio.

Process eliminating amines, cyclic amides, and hydroxy compounds from water by reacting with an isocyanate group. No. 2,029,959. Oliver M. Urbain, Columbus, Ohio, to Charles H. Lewis, Harpster, Ohio.

Process of water purification using reagent of acidic phenol group. No. 2,029,960. Oliver M. Urbain, Columbus, Ohio, to Charles H. Lewis, Harpster, Ohio.

Elimination of carboxylic acids from water by reacting with reagent of acidic amine salt group. No. 2,029,961. Oliver M. Urbain, Columbus, Ohio, to Charles H. Lewis, Harpster, Ohio.

Purification of potable and polluted waters using chlorinated coal. No. 2,029,962. Oliver M. Urbain and William R. Stemen, Columbus, Ohio, to Charles H. Lewis, Harpster, Ohio.

Use of hydroxylated chlorinated coal in water purification. No. 2,029,-963. Oliver M. Urbain and William R. Stemen, Columbus, Ohio, to Charles H. Lewis, Harpster, Ohio.

Use of etherated chlorinated coal in water purification. No. 2,029,964. Oliver M. Urbain and William R. Stemen, Columbus, Ohio, to Charles H. Lewis, Harpster, Ohio.

Reagent for water purification comprising nitrated oxidized carbonaceous material. No. 2,029,966. Oliver M. Urbain and William R. Stemen, Columbus, Ohio, to Charles H. Lewis, Harpster, Ohio.

Vanillin from Waste Sulfite Liquor

Waste sulfite liquor will be processed into a wide variety of products at the plant of Marathon Paper Mills, Rothschild, Wisc., by methods perfected and patented by the company and Consultant Guy C. Howard. New plant occupies an area of 20,000 sq. ft., and is situated next to the acid plant and boiler house of the Marathon Mills. Waste sulfite liquor collected from blow-pits will be treated by the Howard process, a precipitation treatment with lime. This yields a lime-sulfur product for use by the pulp mill in making fresh cooking acid, a lignin product for use by the mill as a boiler fuel or to be utilized as a chemical raw material, and a process effluent of sufficiently improved character to permit discharging into the Wisconsin River without danger of pollution.

Recovered lignin product affords a large tonnage of low-cost raw material, and methods have been developed by which it can be further processed into marketable products. Some of these developments are: Conversion into a tanning product which has been in successful commercial use in the leather industry for more than 2 years. Methods of making a new series of lignin salts and acids, some of which are already in commercial use. Methods of recovering vanillin and various phenolic products from the lignin material. Conversion into resin-like products for use in molded products, for coating and impregnating paper products, and for use in lacquers and coatings.

Policy announced by Mr. Everest, general manager, is to license to other sulfite mills the right to the use of the main process patents, but to restrict the making of special products, and the use of the lignin as a chemical raw material to the Marathon mill at Rothschild and other non-competitive localities.

Chemical Payrolls and the Security Taxes

By Arundel Cotter and Thomas W. Phelps

THE chemical industry strikingly illustrates the most remarkable of the many contradictions between the objective and the reality of the Social Security Act. The chemical industry probably employs fewer men per dollar it adds to the value of its raw materials than any other major manufacturing activity. Under the new law, that means that the chemical industry will pay a smaller proportion of its operating profit and presumably of its net into the Social Security coffers at Washington than any other big business. And if the chemical industry can find a way to mechanize its output still further, to enable it to run its plants with even fewer men, the Social Security Act will reward it by reducing its tax.

At a time when unemployment is still the nation's greatest unsolved problem, the act labeled "Social Security" taxes an employer $1 for every $100 he adds to his payroll, and promises him that next year if he is so reckless as to take on more help it will cost him nearly $3 tax for every $100 he pays to labor. By 1949, the "fine" for giving a man a job, or raising his pay, will be about $6 for every $100 of annual wages involved.

How the taxes would have affected the chemical industry during the past four years, if all other factors had remained as they were, is indicated by the following tabulation of results of du Pont (exclusive of its investment in General Motors Corp.) and its estimated payroll taxes under the new law:

	Payroll	Tax at 1936 Rate	Tax at 1937 Rate	Tax at 1949 Rate
*1936	$74,400,000	$744,000	$2,157,600	$4,240,800
†1935	63,150,000	631,500	1,831,350	3,599,550
†1934	57,760,000	577,600	1,675,040	3,292,320
†1933	45,820,000	458,200	1,328,780	2,611,740
†1932	39,600,000	396,000	1,148,400	2,257,200

* Estimate includes all owned and controlled companies.
† Figures for du Pont and its wholly owned subsidiaries. They include salaries and wages of employees engaged in both operations and construction.

	Sales	Ratio 1% Tax	Ratio 1937 Tax	Ratio 1949 Tax
1935	$220,000,000	1/4 of 1%	4/5 of 1%	1.6%
†1934	184,000,000	3/10 of 1%	9/10 of 1%	1.8%
†1933	156,000,000	3/10 of 1%	6/7 of 1%	1.7%
†1932	126,000,000	3/10 of 1%	9/10 of 1%	1.8%

† Estimated.

	Net Income Exclusive of G. M.	Ratio Tax at 1936 Rate	Ratio Tax at 1937 Rate	Ratio Tax at 1949 Rate
1935	$39,587,691	1.6%	4.6%	9.1%
1934	31,701,831	1.8%	5.3%	10.4%
1933	26,395,057	1.7%	5.0%	9.9%
1932	13,734,505	2.9%	8.3%	16.4%

Du Pont's actual net for each of the last 4 years, of course, was from $12,500,000 to $22,500,000 higher than the net shown in the tabulation, due to income received from its investment in General Motors.

Six other chemical companies listed on the N. Y. Stock Exchange (group includes some alcohol and powder production) estimate their aggregate 1% payroll tax for the current year at $166,350, which is 1.5% of their '34 net profits. Assuming that next year's 1% payroll tax for old age pensions applies to 90% of total payrolls, total '37 levy on the basis of current employment and pay scales would be $482,415 for the 6 companies. By '49, when the maximum rates take effect, the levy would be $948,195.

Actually that probably overestimates the tax for this group, because 2 of the companies which estimated the pension tax separately from the unemployment tax figured the former at 82.6% and 84.9% of the latter. The unemployment tax of 1%, effective this year, applies to all payrolls, while the pension tax, which begins at 1% next year, applies only to that part of all wages and salaries under $3,000.

On the other hand, of course, is the possibility that state "social security" taxes may increase the burden, not only for this group, but for all companies.

The 1937 federal social security tax rate, applied to current payrolls, would amount to 4.4% of the chemical group's 1934 net, while the '49 rates would require a tax equivalent to 8.6% of the 6 companies' 1934 earnings.

One of the chemical companies actually has a total annual payroll which is smaller than its '34 net profits, which by the way continued at about the same level through the 1st 9 months of '35. What that means in terms of the Social Security payroll taxes is that the current year's levy of 1% of total payroll will cost the company about 0.85% of its net income, while the maximum tax rate, effective in '49, would require less than 5% of earnings, assuming that none of it was passed on to consumers.

Payroll for the group of 6 is only 1.5 times the group's net profits. When all '35 reports are available, ratio probably will be found to be even lower than it is by comparison with '34 results, as reports thus far available generally show increased earnings.

A possible offset to whatever taxes are imposed would be discontinuance of the companies' voluntarily maintained employee benefit plans. These vary with different companies, but in general have been carried farthest by the largest corporations. Du Pont for 17 years has paid for group life insurance to employees in amounts ranging from $700, after one year's continuance service, up to $1,500 after 5 years' service. At the end of '35 policies in effect under this plan aggregated $46,200,000, covering 37,939 eligible employees. Company also has had a pension plan in force for 31 years. At the close of '35 there were 871 persons on the pension roll, receiving an average of $57.21 a month, and the pension trust fund amounted to $19,685,952.

"The effect on this plan of the Social Security Act, which imposes taxes for the establishment of a Federal Pension Plan, has not been fully determined," company states. "Unless the Act is held unconstitutional, or unless it is amended by the Congress now in session to exempt from its provisions those companies which maintain private pension plans and your company qualifies for exemption under such amendment, important changes adverse to the employees' interest may be necessary in your company's pension plan because of the additional financial burden imposed by the Social Security Act.

"An actuarial study now under way will, when completed, serve as a basis for determining what changes may be required in your company's pension plan because of the additional financial burden imposed by the Social Security Act."

Another of the 7 chemical companies cooperating in The Wall Street Journal's study of the effects of the Social Security Act is currently paying more than twice as much annually under its non-contributory and non-contractual pension plan as it will be required to pay this year under the federal act. That company has reached no conclusion with respect to the future of the plan. Its continuation is held likely to depend largely on future costs, and the extent to which the Social Security Act serves the purpose it is intended to serve. It is pointed out that the federal act makes no adequate provision for disability cases where such disability occurs comparatively early in life.

"We feel the principle of Social Security is highly commendable, and if the present Act is economically and financially sound, I feel it should have the approval of industry, but I am inclined to doubt its soundness in some respects, as well as its constitutionality, and I am decidedly of the opinion that some amendments should be made to the Act as it now stands, such as a clarifying amendment, and an amendment transferring a larger portion of the cost from the employer to the employee, etc.," one company's president declared.

The only unemployment insurance plan reported by any of this group is a contributory plan of unemployment compensation for salaried employees. It provides at nominal cost from one month's to 4 months' salary for white collar workers let out because of curtailment of expenses or depressed business.

No references to the comparative impact of the Social Security taxes on the chemical industry should be misinterpreted to mean that that industry is lightly taxed in general. To cite only one example, du Pont during '35 paid or accrued some 40 different kinds of taxes which in the aggregate approximated $10,000,000 and represented 90c a share on the common stock, compared with the $5.04 a share earnings reported to stockholders. The point is simply that payroll taxation hits most other lines of business a good deal harder than this one.*

Gasketed Joints In Chemical Operations

Gasketed joints are classified by types and suggestions for use of materials on various types and for various chemicals are given. Requirements for a perfect gasket are:

1. It shall be reasonably impervious to the fluid being handled.
2. It shall be sufficiently chemically resistant, both on its inner and outer exposed edges, to the fluids with which it comes in contact so that its essential physical properties are not impaired, or at any rate, so that the deterioration does not extend rapidly into the body of the gasket.
3. It shall not contaminate undesirably the fluid being handled or promote corrosion of the flanges.
4. It shall be capable of withstanding the required bolt pressure without crushing or undergoing excessive plastic flow.
5. It shall be sufficiently deformable, without resort to excessive thickness, to distribute the applied pressure fairly evenly over the flange surface, compensating for any irregularities.
6. It shall be sufficiently elastic to maintain at least a portion of the applied pressure in the face of such joint movements as are not fully eliminated by the joint design.
7. If not contained in a flange of grooved or shouldered cross section, it shall develop sufficient friction in contact with the flange surface to resist a sliding-out tendency.
8. It shall lend itself to easy installation, separation (when required), and ultimate removal.

There then follows specific recommendations:

Water. This heading includes also alkaline and neutral aqueous solutions. Maximum temperature, 212° F. or slightly higher.

Recommended type of gasket is plain rubber. Some rubber compounds are more heat resistant than others. For high-pressure (hydraulic) service, rubberized cotton fabric or wire cloth should be used.

Acids. Maximum temperature, 212° F., or slightly higher. Recommended type of gasket is rubber compounded from acid-resistant fillers and is satisfactory for all strengths of hydrochloric acid and for sulfuric up to about 70 per cent. by weight. Higher concentrations, especially if hot, char the exposed edges but may work well occasionally; otherwise, folded gaskets of fabric woven from blue (crocidolite) asbestos should be used. Treatment may be paraffin or asphalt. Similar gaskets are required for nitric acid in nearly all concentrations. Metal-jacketed gaskets are probably usable if constructed from acid-resistant metal, but metal gaskets in which asbestos fiber is exposed to the action of acid are not recommended, since the fiber is chrysotile and readily attacked. Solid metals (viz., lead gaskets for sulfuric acid) can be used if the flange develops sufficient pressure.

Superheated Water and Steam. This classification includes also superheated aqueous solutions. Maximum temperature encountered is about 700° F. As gasket material for this type of service, rubber develops too much plastic flow and cotton fabric is carbonized. For boilers (manhole and handhole cover plates) at not too high temperatures and pressures, compressed asbestos sheet gaskets can be used, although the rough condition of the flanges generally requires a more compressible gasket. Gaskets of folded asbestos cloth construction with a heat-resistant rubber cement are widely used and are recommended if the unit pressures and temperatures are not too high. The best narrow flange boiler handhole gasket of this type are made from folded lengths of rubberized seamless-woven asbestos tubing. Metal gaskets of the jacketed type and of the type constructed from strips on edge are also widely used, especially for the higher range of temperatures and pressures.

For bolted pipe flanges, folded asbestos fabric gaskets are somewhat lacking in crushing strength; furthermore the flanges are accurate enough to permit a thinner and less compressible gasket. Compressed asbestos sheet is the most widely used material, although, with the advent of higher steam temperatures, there has been a drift in the direction of metal gaskets of the corrugated, jacketed, and strip-on-edge types. (The newer type of perforated metal-asbestos-paper gasket appears to have been employed so far principally for automobile cylinder heads, where it competes successfully with the jacketed gasket in withstanding both hot water and oil.)

Sulfite digesters are packed in the same way as boilers, using folded gaskets or compressed asbestos sheet, with the additional requirement that the rubber compound must be acid-resistant (the acid is not strong enough to require the use of blue asbestos). Metal gaskets, especially of chrome-nickel steel, are also widely used.

Large bolted flanges for hot water or steam service are frequently packed with a flat folded rubberized asbestos fabric tape which is spliced in the field to make a gasket of the required diameter. A somewhat similar tape is made from flattened braided tubing. Where a very compressible gasket is required to compensate for flange warping, etc., a tongue-and-groove construction is generally used with a thick gasket, folded or rolled up from a strip of rubberized asbestos fabric, placed in the bottom of the groove.

Alcohol, Glycerol, Acetone. This heading also includes other organic liquids with a slight swelling action on rubber.

Maximum temperature, 212° F. approximately. As a gasket material, rubber is usable, except that extracted resins may contaminate the fluid. Organic acids (such as acetic) impose the additional requirement that the rubber compound shall contain only acid-resistant fillers.

Mineral Oils, Etc. This heading includes also tar, creosote, vegetable oils, fatty acids, etc. Maximum temperature, 700° F. For the gaskets, pure rubber compounds (unless of the hard variety which is not suitable for gasketing) generally swell too much or are weakened, or both, in this type of service, especially if the temperature is elevated. Duprene compounds are more resistant than rubber compounds of equivalent hardness and are finding applications in this field. In the higher temperature ranges fairly satisfactory results are obtained with certain types of compressed asbestos sheet, or, where a more compressible gasket is required, with folded or rolled asbestos fabric constructions containing a binder of highly oil-resistant rubber compound. Untreated asbestos paper is also used.

* One of a series of copyrighted articles by Arundel Cotter and Thomas W. Phelps appearing in the *Wall St. Journal*, showing the effect of Social Security Act on various industries. Reproduced by permission.

For temperatures below 212° F. and low pressures, cork, or vegetable fiber sheet are quite satisfactory and largely used for such applications as automobile crank cases, etc. At high temperatures they dry out and shrink.

Metal gaskets of all the compressible types can be used against oils of any temperature where the oil contains nothing that will attack the metal. For high-sulfur mineral oils it is necessary to avoid copper alloys; aluminum is widely used for this service. Solid metals can be used where the flanges are designed to develop the necssary pressure.

Gasoline, Etc. This classification comprises also benzene, turpentine, chlorinated solvents, etc., including wet natural or manufactured gas, or refrigerant gases (Freon, methyl chloride, etc.) carrying a condensed refrigerant. Maximum temperature, 212° F. In this service, rubber (except hard rubber) swells badly and is weakened. Advantage is taken of the swelling of rubber to seal rough flanges where the joint is not opened, but even in these cases the edges crumble badly. Performance is better with compressed asbestos sheet and constructions of rubberized fabric, especially if the rubber compound is of a solvent-resistant type. Duprene is decidedly better than most rubber compounds against gasoline, Freon, and some other solvents, but shows little advantage against certain other types of solvent. Thiokol is practically indifferent to solvents (except carbon disulfide), but its plastic flow is a troublesome feature although it can be overcome to a large extent by fabric or wire reinforcement. Cork and vegetable fiber sheet can be used where pressures and temperatures are low. Metal gaskets of all kinds can be used, although it is sometimes difficult to hold back liquid solvents because of their mobility. Metal gaskets of copper alloys must be avoided in contact with liquid ammonia.

Hot oils and solvents represent the fields in which the weakness of rubber or rubber-bonded gaskets is most apparent, and the need for suitable substitutes is most keenly felt. It cannot be said, however, that wholly satisfactory materials have been found, taking into consideration both chemical and mechanical properties, although a wide variety of nonrubber gasketing materials are finding limited application.

Air and Dry Gases. The temperature should not exceed 700° F. Standard gaskets are the same as for water and steam—plain rubber for low temperatures, and compressed asbestos sheet or folded asbestos fabric for high temperatures, with metal gaskets optional for either service. Rubber compounds must be selected with care for compressed oxygen service since some of them are spontaneously inflammable. Air, oxygen, nitrogen oxides, ozone, and the halogens convert the exposed edges of rubber or rubber-bonded gaskets to a brittle resin, but the action does not penetrate the interior of the gasket very rapidly.

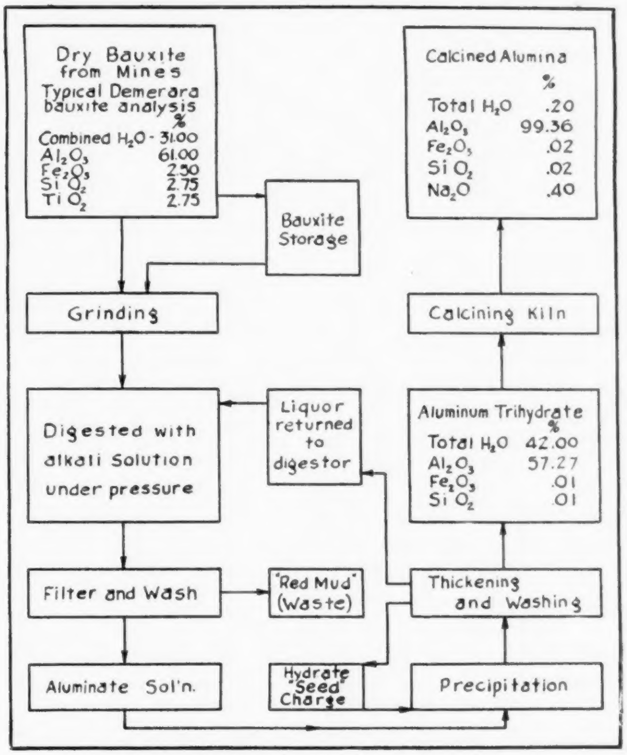
Liquid Chlorine and Bromine. At any temperature these materials attack vigorously any organic binder, even paraffin. The writer knows no fibrous gasket which is satisfactory against either of these materials, although it has been claimed that asbestos paper treated with certain types of asphalt paint has been used successfully against bromine. If the materials are anhydrous, certain metal gaskets can probably be used successfully.—F. C. Thorn, *Ind. & Eng. Chem.*, February, '36, p164.

Bayer Alumina Process Discussed

The Aluminum Company of Canada Ltd., subsidiary of Aluminium Ltd., is making an important extension to its plant at Arvida, Que., for the extraction of alumina from bauxite by the "Bayer" process. New process will tie in with the existing "Hall-Hoopes" process and utilize certain steps, buildings and equipment which have been associated with it. Extension involves the construction of new buildings and the installation of equipment to a value exceeding $1,000,000.

Flow-sheet outlines the main steps in the Bayer process, which is one of the oldest and most widely used for the production of alumina from bauxite.

Bauxite, after grinding to a suitably fine mesh, is digested with hot caustic liquor under pressure in large steam-heated pressure vessels. Caustic soda liquor is made up in process by the reaction of soda ash and lime (either quick or hydrated),



BAYER PROCESS FOR ALUMINA PRODUCTION

and the resulting calcium carbonate is removed later in the process with the red mud. Caustic soda dissolves the alumina, Al_2O_3, almost completely, but has little effect upon impurities in the bauxite, which are mainly the oxides of iron, silicon and titanium. These form an insoluble residue which is separated from the sodium aluminate solution by hot filtration under pressure, and after being thoroughly washed to remove caustic soda is discarded as the waste material called "red mud." While the red mud will be a waste product for the present, there are a number of potential uses for it, among which may be mentioned: as a base for paint, insulating material, source for titanium oxide or filler for rubber.

The filtrate is gradually cooled in large steel precipitation tanks to the point where the crystallization of aluminium hydrate sets in, abetted by a "seed" charge of previously precipitated aluminium hydrate returned from the subsequent thickening operations. After precipitation is complete, entire mass is pumped through a series of thickening operations, followed by a washing to remove, as far as possible, extreme fines and caustic soda.

Washed aluminium hydrate is then pumped to the kiln building storage-tanks and passes from there through a vacuum filter which reduces the water content to the rotary kiln. Calcination is effected in rotary cement type kilns at the relatively high temperature of 1100°C., to remove both free and chemically combined water and convert the hydrate to a non-absorptive oxide. In order to eliminate any possibility of contamination, fuel oil is used for firing the kiln. Calcined product, after screening, is ready for conversion to aluminium or for any of the many other uses requiring a very pure aluminium oxide.

A tremendous amount of steam is required for process heating and this will be furnished by a 15,000 kva., 6,600 volt electric steam generator. A. W. Whitaker, Jr., *Canadian Chemistry & Metallurgy*, Jan., p8.

Plant Management

Suggested Rates for Determining Depreciation

Depreciation of equipment is always a difficult question to work out satisfactorily for purposes of income tax figuring. In England, Leopold Farmer & Sons, London, equipment specialists, have worked a very handy compilation for guidance of English chemical makers. As a comparison to practices in this country the following is enlightening.

In all cases, suggested rates are given for use where a detailed schedule of equipment is kept, and which can be used as a basis for arriving at a figure for internal bookkeeping, or costing or income-tax purposes, where no agreed rates between the manufacturer and the income-tax authorities is in force. A 2nd set of figures is given where agreed rates exist between the Inland Revenue and the trades concerned. In some cases these agreed rates have been fixed for a number of years, but they are not binding and are subject to review on evidence being produced that a higher rate is justified. In the compilation of these figures it has been assumed that the plant and machinery in question is maintained in efficient working order, and the cost of additions and replacements charged to capital account. Figures given are also to be taken as a fixed annual charge on written-down value, as by this method the charge for depreciation and repairs is spread more evenly over the life of an asset.

So far as the chemical trades are concerned, the following are the figures given, the 2nd in each instance being the agreed rates between manufacturers and income-tax authorities: Sulfuric-acid plants, 15%, 15%; pans, autoclaves, blow eggs, grinders, mixers, filter presses, and small similar plant, 6%, 5%; vats, chambers, furnaces, stills, condensers and ancillary plant, 12½%, 7%; ice-making plant, 10%, 7½%; electrolytic apparatus, 12%, 7½%; synthetic dyestuffs plant, 15%, 15%; steam-power plant, 7½%, 7½%; tank cars for deleterious material, 10%, 7½%.

It is pointed out that no depreciation is allowed for income tax purposes on any plants constructed of earthenware, glass, silica or similar materials, but repairs and renewals to same are chargeable in lieu thereof. It is also to be noted that by the Finance Act, 1932, Section 18, it is enacted that where under Rule 6, applicable to Clauses 1 and 2 of Schedule D, a deduction in wear and tear of machinery is allowed, the Commissioners shall allow an additional deduction equal to one-tenth of the amount of the deduction allowed under the said Rule 6." Thus, where a rate of 5% had been agreed upon, this would be increased to 5½%.

The cases of the rayon, cement, color and paint, glue and gelatine, rubber, salt and soap trades are among the many covered.

Plant Equipment

New Method for Preparing Sulfuric Catalyst

Sulfuric acid contact catalysts are prepared as follows: Magnesium sulfate crystallized with 1 molecule of water (prepared by dehydration at 100 to 120° C. of the fully hydrated salt) is powdered, mixed with half its weight of water to a paste and evaporated to dryness with vigorous stirring. After final calcination in an electric furnace at 600° C., product in the form of granules (2.5 to 3.5 mm. diameter) is platinized in platinum chloride solution, concentration of which is equivalent to 0.1% platinum. After dehydration in the air at 350° C., catalyst is activated at the same temperature with a gas containing 2% sulfur dioxide. Matsui & Oda, *Journal Society of Chemical Industry of Japan*, '35, p148b.

Acid Resistance of Iron-Silicon Alloys Measured

Iron-silicon alloys (15% silicon) possess remarkable properties of acid resistance. Following table of tests indicates high value for sulfuric and nitric and also other of the more common acids.

Acid	Initial Weight Grams.	Loss after Boiling at 150° C. for: 24 hrs. Grams.	48 hrs. Grams.	72 hrs. Grams.
Sulfuric acid, 65%	112.648	Nil	Nil	Nil
Sulfuric acid, 20%	115.207	Nil	Nil	Nil
Nitric acid, 90%	13.392	0.011	0.038	0.074
Nitric acid, 30%	116.629	0.013	0.016	0.016
Acetic acid	115.475	Nil	Nil	Nil
Chromic acid, 10%	115.264	0.547	0.631	0.670
Tartaric acid, 25%	117.428	0.028	0.101	0.154
Oxalic acid, 25%	117.867	0.041	0.061	0.091
Ammonium chloride, 20%	120.257	Nil	Nil	Nil

Data given by S. J. Tungay before the Sir John Cass Technical Institute, London.

Plant Operation

Phosphoric Acid Storage in Steel Tanks

Phosphoric acid storage is possible in steel storage tanks, provided the acid is above 89% concentration, and that it is free from significant quantities of pyrophosphoric acid and metaphosphoric acid. With a material of 97.5% strength, it has been determined that the rate of corrosion of iron or steel is only 2.36 mm. per annum at a temperature of 75° C. At 25° C. the corrosion is practically nil. Solvent properties of phosphoric acid for iron decrease markedly as the concentration of the acid rises from 88.8 to 89.8%. Information disclosed in Victor Chemical Works' U. S. Patent No. 2,004,926.

Wood Preferable for Turpentine Storage

Turpentine storage in iron tanks is inadvisable. Such tanks should be lined with wood if possible; if not, they should be coated with shellac or possibly with a clear or pigmented cellulose lacquer which should not contain a large proportion of turpentine soluble resin. *The Manufacturing Chemist*, British, Jan., '36, p32.

Industrial Dust Problems Attacked

Air Hygiene Foundation of America, dealing with industrial dust problems, H. B. Meller, managing director, Thackeray ave. and O'Hara st., Pittsburgh, met for the first time Feb. 11th. Foundation invites cooperation of all interested.

Industrial Chemicals

Camphor Catalyst in Sulfuryl Chloride Production

Sulfuryl chloride is made from sulfur dioxide and chlorine by a new method employing camphor as a catalyst. Ten grams of pure dextrorotary camphor are placed in a 500 cc. ice-cooled flask and a stream of sulfur dioxide is passed through for an hour, followed by a stream of chlorine for the same time. Passage of the 2 gases is then repeated in the same order for 30 minutes each. Finally, both gases are simultaneously introduced until no more is absorbed by the liquid in the flask. About 24 hours in all is required. Contents are distilled on a water bath and the fraction boiling at 68 to 70° C. is collected. After fractionating the distillate to remove traces of camphor, sulfuryl chloride is obtained as a colorless liquid in a yield of 46.1%. Tseng & Sze, *Sc. Quart. Nat. Univ. Pekin*, '35, p344.

Pure Cerium Produced from the Chloride Salt

Cerium, 97% pure, is prepared by reducing cerous chloride with commercial calcium: $2\ Ce\ Cl_3 + 3\ Ca = 3\ CaCl_2 + 2\ Ce$. Ferrocerium is also readily prepared by this reaction, calculated amount of iron being added before or after the treatment with calcium. A typical alloy produced in this manner had the composition: Cerium 63.4%, iron 33.8%, copper 1%, calcium 0.3%, and 0.2% magnesium. Karl, *Bulletin Soc. Chim.*, '35, p871.

Removal of Impurities in Tungstic Acid

Tungstic acid may be purified through the removal of molybdenum compounds by the conversion into the ammonium salt and treatment of the latter with hydrochloric acid in quantity equivalent to 50 to 70% of that required for complete precipitation of the tungstic acid. The mother liquid is treated in the same manner. Russian Patent 40,341.

Aluminum Carbide in Dark-Orange Form

Aluminum carbide is prepared in a dark-orange form by heating very pure aluminum turnings with the theoretical amount of ash-free carbon in a completely enclosed carbon crucible in a nitrogen-free hydrogen atmosphere Process is operated at 2,000° C. for 30 minutes under a pressure equivalent to one atmosphere. Carbon of requisite purity is prepared from old carbon rods used as heating resistances in electric furnaces, these being extracted with boiling hydrochloric acid and washed and dried. *Chemiker Zeitung*, Jan. 4th.

Stabilization of Zinc Chloride Solutions

Zinc oxychloride separation out of zinc chloride solutions can be avoided by preliminary addition to the water of alkaline chlorides or other substances forming soluble and crystallizable double salts with zinc chloride. This method is not practicable in pharmaceutical work where the following alternative method is recommended. Starting with a 50% stock solution of pure fused zinc chloride, appropriate quantity for preparation of any given dilute solution is withdrawn and diluted with freshly boiled water acidulated with just enough hydrochloric acid to prevent formation of the basic salt. This method is tantamount to a reversal of the reaction: $2ZnCl_2 + H_2O = 2HCl + ZnCl_2.ZnO$. Sido, *Pharm. Zeitung*, Germany, '35, p789.

Aluminum Hydrate in Cadmium Pigments

Aluminum hydrate improves cadmium sulfide pigments when added to the other ingredients, cadmium carbonate, sulfur and, usually, selenium, according to a process patented by Kali-Chemie A. G., Berlin. Pigments thus obtained are more brilliant and stronger tinctorially.

In carrying out the new process, alumina can be added in the dry state to the mixture to be calcined, or the alumina can be precipitated together with the cadmium carbonate in an earlier stage of the process. Further addition of blanc fixe is claimed as an additional advantage. In an example, a solution of cadmium sulfate is precipitated with the corresponding quantity of barium chloride. Without filtering, solution is then treated with the requisite quantity of an aluminium salt and then precipitated with alkali carbonate. Precipitate is filtered, washed, and after drying, calcined with sulfur or with sulfur and selenium. To obtain a yellow with a greenish tint, small quantities of zinc sulfide are added to the mixture before burning.

Tellurium as a By-Product of Superphosphate

Tellurium as a by-product of superphosphate manufacture is reported in Russia. Dust was mixed with hydrochloric acid and boiled for 4 or 5 hours after which it was treated with potassium chlorate as an oxidizing agent producing telluric acid. Latter was reduced by boiling to tellurous acid and after dilution with 2 or 3 times its volume of water, reduced with sulfur dioxide to metallic tellurium. Consular Clerk W. S. Jesien, Frankfort-on-Main, Germany.

Flotation Methods in Barite Processing

Tests made by the Bureau of Mines at its southern experiment station at Tuscaloosa, Ala., indicate that the purity of barite ores produced in the south can be measurably improved by the use of the flotation process, members of the American Institute of Mining and Metallurgical Engineers heard last month at the annual meeting held in N. Y. City.

Sales of domestic crude barite have increased from 52,919 tons in '14 to 209,850 tons in '34, but a considerable amount of the ore is still imported. Furthermore the imported ore commands a price differential because of the purity of product and its inherent softness, instead of being hard like many of the domestic ores.

Tests made by the federal bureau indicate that impurities in the domestic ores, which could not be removed by the washing or gravity concentration methods used in the past, can be removed by flotation, according to R. G. O'Meara and G. D. Coe, metallurgists, who conducted the tests.

Barite deposits of economic importance occur in at least 20 states, the 2 federal engineers explained. Principal producers in '34 were Missouri, Georgia, Tennessee, South Carolina, Virginia, California, and Arizona. Barite is used chiefly for manufacturing barium chemicals and lithopone, a mixture of zinc sulfide and barium sulfate used extensively in the manufacture of white pigment, linoleum, rubber tires and other products. Use of lithopone is steadily increasing. Germany, by virtue of an abundance of high-grade ore, has previously dominated the world market.

Mining Engineers Hear Reports on Sulfate Source

Discovery of several large deposits of natural sodium sulfate (Glauber's salt) in the northwestern part of North Dakota during the summer of '35 resulted from a survey made by the Federal Emergency Relief Administration, Prof. Irvin Lavine and Herman Feinstein of the University of North Dakota revealed at the meeting. Over 20 million tons of Glauber's salt have been proved in these deposits.

Speakers noted that the obstacles in the way of successful exploitation of the North Dakota deposits are not many and should be readily overcome. Several manufacturers have had 1st-hand observations made of the deposits and are highly interested. An increase in market price of the finished product will hasten their commercial development. A producer of natural salt cake has estimated production costs at about $7.25 per ton of dehydrated salt cake in a plant having a capacity of 125 tons per day at Grenora, North Dakota, using lignite as the fuel.

Petroleum

Sulfuric Acid Regeneration in Petroleum Field

Because of the interest in methods of regenerating the large quantity of sulfuric acid used in petroleum refining, it is believed that a report of some typical experiments on the recovery of sulfur dioxide from the sludge, as well as data on the acid actually lost in treating the oil, will be welcome to chemists and petroleum refiners who have followed the development of the Chemical Construction Corp. process of expelling sulfur dioxide from acid sludge by heat and converting the sulfur dioxide into fresh acid by catalyst.

The sulfuric acid in typical gasoline and kerosene acid sludges is converted by moderate heating into sulfur dioxide in yields of 93 to 94%, based on the acid used in refining. The sulfur in the acid not expelled as sulfur dioxide remains in combination with the coke. The coke is neutral and easily pulverized. An accounting is made for the sulfuric acid used in refining the light oils. The sulfur dioxide can be converted catalytically into fresh sulfuric acid. Rate of spontaneous decomposition of sulfuric acid to sulfur dioxide in cracked gasoline acid sludge has been measured. B. A. Stagner, *Ind. Eng. Chem.*, Jan., p172.

Ozone in Gasoline Desulfurization

Gasoline desulfurization through the use of ozone is reported. Operation is improved by steam distillation in the presence of chalk. *Chemical Age*, London, Jan. 25, p81.

Billy Bounce is a tough guy

IT'S TRUE that he spills his orange juice, which is a very bad thing to do—even if he *is* a rubber doll. But toughness is a virtue when you have to pal around with a two-fisted fellow like Bobbie (the chap with the curls).

There was a time when a rubber doll just couldn't take it—but today rubber dolls (and other rubber things from tires to hot water bottles) are made more sturdy and stout-hearted by chemicals developed by chemists of the rubber industry, aided by Du Pont research.

Curiously enough, the very orange juice that Bobbie himself drinks so nicely, comes from golden fruit the orange grower protected with Du Pont Plant Spray.

And Bobbie's wash-suit, which is a joy to his mother because it stays so bright and blue, can thank a Du Pont fast dye for its color.

At almost any moment in the daily life of the average person—young or old—modern chemistry is contributing useful service of one sort or another.

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ORGANIC CHEMICALS DEPARTMENT . . . . WILMINGTON, DELAWARE

Laboratory

Newly Suggested Materials for Laboratory Ware

High-melting metallic oxides of beryllium, zirconium, magnesium, and thorium possess advantages for laboratory ware. Beryllium oxide closely resembles aluminum oxide in many chemical properties but is notable for its high melting point (over 2,000° C.) and its superior resistance to reducing agents. On the other hand, its basicity is higher than that of the aluminum compound which renders it more liable to attack by acidic substances, although the contrary is naturally the case when alkaline fusions require to be carried out. Beryllium oxide possesses an exceptionally high electrical resistance which renders it eminently suitable as a support for heating coils.

With a melting point in the neighborhood of 2,700° C. and excellent resistance both towards acids and alkalies, zirconium oxide is another important material. Chemically pure oxide cannot, however, be processed by the usual ceramic methods owing to the allotropic change about 1000° C. accompanied by considerable alteration in the specific volume of the material. This defect can be overcome by incorporating a small proportion of oxides with low molecular volumes, notably magnesium oxide and beryllium oxide. Crucibles composed of zirconium dioxide can be used up to a temperature of 2000° C. for fusing a wide range of glasses, slags and minerals, especially those with an acidic reaction.

A still higher melting point is possessed by magnesium oxide (2800° C.), and stoneware prepared from the pure fused oxide resists the most drastic thermal strains. Fused magnesia crucibles have proved satisfactory in the melting of both precious and non-precious metals.

Thorium oxide is distinguished by the highest melting point of all known oxides (3000° C.). Apparatus prepared from the pure substance has recently come into use in estimating the melting point of metals of the platinum group. In general, thorium oxide apparatus can be used in all cases where very high temperatures are applied in the absence of carbon, the very low vapor pressure of the oxide being an appreciable advantage for high temperature vacuum experiments. Dr. E. Ryschkewitsch, *Chemische Fabrik*, Jan. 7, '36.

Cane Bagasse as a Chemical Raw Material

Alpha-cellulose production from cane bagasse in which inexpensive organic aliphatic acids may be substituted for nitric; biochemical production of butyric acid from sugar factory final molasses; utilization of sugar factory filter press mud for the manufacturer of activated char and cane waxes, are reported on in "Chemical Work of the Puerto Rico College Station"—Station Report '34, p46-47, 151-157.

The Literature

Articles of interest to the chemical and process industries particularly noted in a monthly review of the U. S. and foreign periodicals.

Aluminum. "Economics of the Aluminum Industry," by Francis C. Frary. An intimate analysis of the aluminum industry, its history, development, importance, and some of its present problems. *Ind. & Eng. Chem.*, February, p146.

Aluminum. "Fifty Years of Aluminum Alloy Development," by E. H. Dix, Jr., and J. J. Bowman. Historical material which looks to the future as well as the past. *Metals & Alloys*, February, p29.

Analytical Methods. "A Reversible Indicator for the Detection of Small Quantities of Hydrogen Sulfide in the Atmosphere," by J. Bell and W. K. Hall. Method of detecting the gas industrially when it is present in such quantities that analysis by sense of smell is uncertain. *Chemistry & Industry*, January 31, p89.

Bleaching. "Chlorine Handling and Bleach Make-Up Equipment," by W. L. Savell. Materials of construction, design of equipment and upkeep are discussed. Article also outlines transportation problems. *The Paper Industry*, February, p822.

Bleaching. "Buffered Bleaching," by C. T. Henderson. Chemically buffered bleaching systems, how they operate, advantages, and accompanying flow-sheets are pictured and discussed. *The Paper Industry*, February, p820.

Bleaching. "Water Considerations in Pulp Bleaching," by DeVane Hamilton. The water factor in pulp bleaching is traced through every step of pulp manufacture to assure the manufacturer of proper efficiency in his bleaching process. *The Paper Industry*, February, p818.

Bleaching. "Lime for Pulp Bleaching," by O. L. Cook. Discussion on the use of either high calcium lime or hydrated lime with chlorine for the preparation of bleaching powder in pulp bleaching. *The Paper Industry*, February, p815.

Bleaching. "Calcium Hypochlorite for Bleaching of Pulp," by Ferri Casciani and Axel Heilborn. Production and use of bleaching powder and bleach liquor are thoroughly outlined and discussed in an authoritative article. *The Paper Industry*, February, p810.

Bleaching. "Chlorine—Its Properties for Pulp Bleaching," by Harvey G. Elledge. This research chemist for a large alkali producer tells how chlorine should be used for most effective bleach. Article includes many very practical scientific hints for pulp industries. *The Paper Industry*, February, p806.

Bleaching. "Peroxide Bleach Baths and Some Factors Influencing Their Stability," by D. J. Campbell. This article, limited entirely to cotton bleaching, analyzes the important problem of peroxide decomposition in bleach baths, and the subsequent difficulties encountered. *American Dyestuff Reporter*, February 10, p67.

Cellulose. "The Nature of Cellulose," by E. Heuser. A fine historical review of the cellulose industry. *American Dyestuff Reporter*. February 10, p55.

Compressed Gas. "The Handling, Storage, and Proper Control of Compressed Gas Cylinders," by F. R. Fetherston. An outline of the special considerations required for oxygen and acetylene cylinders as well as general discussion of handling problems for all compressed gases. *Oxy-Acetylene Tips* (Linde Air Products Co.), February, p29.

Cotton. "Cotton and Its Chemical Reactions," by James F. Holmes. A brief, not too technical review of cellulose chemistry. *Textile Colorist*, February, p83.

Dyestuffs. "Natural Indigo Production in Japan," by Herbert Leopold. From Tokio comes the report that Japan's indigo production is holding its own against synthetic dye manufacture. A brief, important article. *The Dyer & Textile Printer*, January 31, p119.

Gasoline Refining. "Phosphorus Pentoxide as a Refining Agent for Gasoline," by Boris W. Malishev. A discussion of the chemistry involved in this refining process which is said to yield fuel with somewhat pronounced increase in octane rating. *Ind. & Eng. Chem.*, February, p190.

Glass. "Chemical Properties of Glass Surfaces," by G. Keppeler. The importance of glass or glass-lined equipment to certain process industries makes this review of chemical glass limitations particularly valuable. *The Glass Industry*, February, p43.

Glass. "The Nature of the Selenium-Pink Color," by W. Hofler and A. Dietzel. This brief article brings the discussion of selenium coloring down to its finest points with an investigation into what state of division the selenium should be in to produce most satisfactory results. *The Glass Industry*, February, p49.

Glass Cleaning. "Chemical Cleaning of Molds," Chemical methods for cleaning metal scalings and greasy residues from mold parts which result from present-day mechanical methods of forming glass containers. *The Glass Industry*, February, p47.

Paper. "Progress of Latex in the Paper Industry," by R. L. Fine. The author gives a short review of the history of his subject, a thorough description of production methods, and a summary of latex paper uses. *The Paper Industry*, February, p801.

Pigments. "Lead Titanate," by D. W. Robertson. This new paint pigment is discussed with reference to optical properties, inertness in vehicles, particle size, and behavior in films on exposure. *Ind. & Eng. Chem.*, February, p216.

Plastics. "Laminated Gears Are Both Strong and Silent." Dipped phenolic resin laminated materials are coming into wide use as gear parts where accuracy and silence are required. This brief article summarizes progress of the new development. *Modern Plastics*, February, p22.

Potash. "Potash from Polyhalite by Reduction Process," by F. Fraas and Everett P. Partridge. Summary of investigations in which polyhalite reduction was carried out continuously in a laboratory rotary kiln, using hydrogen and carbon monoxide from natural gas. *Ind. & Eng. Chem.*, February, p224.

Resins. "Synthetic Resins—Their Application to Textiles," by D. H. Powers. This fascinating article on the development, production and use of resin-coated fabrics, contains also an excellent short history of resin development. *American Dyestuff Reporter*, February 10, p71.

Road Materials. "Adhesion in Relation to Bituminous Road Materials," by A. R. Lee. This particularly complete study of the use of adhesive substances in road building includes listing of general adhesive characteristics, and review of testing methods for essential properties of road binders. *Journal of the Society of Chemical Industry*, February 7, p23T.

Silk. "Lime Soap Formation in Silk Soaking and Its Treatment," by J. M. F. Leaper. Investigation has shown a calcium complex to be present in the sericin coatings, and the author discusses silk soaking-room problems with an eye toward this solution. *The Dyer & Textile Printer*, January 31, p113.

Soap. "Continuous Soap Manufacture," by Joseph M. Vallance. A British soaper discusses the revolutionary Lofil dispersoid-pressure process for continuous soap production. *Soap*, February, p65.

Soap. "Palm Oils," by Margaret J. Hausman. Uses of palm and palm kernel oil are discussed, along with short descriptions of production, refining, bleaching and grading methods. *Soap*, February, p26.

Stoneware. "Old and New Stoneware," by Felix Singer. A well-known consultant discusses the modern definition of chemical stoneware and briefly summarizes its important uses. *Ceramic Age*, February, p7.

Tanning. "Bating: Some Important Theoretical and Practical Observations," by Frederic L. Hilbert. The article's title amply describes its content. *Hide & Leather with Shoe Factory*, February 8, p20.

Textile Emulsions. "Analysis of Emulsions," by E. J. French. The procedure reviewed here, good for either qualitative or semi-quantitative work, included estimation of sulfonated oil, free fatty acid content, gums, mineral oils, etc. *Textile Colorist*, February, p103.

Textile Soaps. "Soap-Like Bases," by Edward W. Pierce. Summary of progress being made in substitution of higher alcohol sulfo esters for soaps in textile processes. *Rayon & Melliand Monthly*, January, p71.

Wood Tanks. "Wood Tanks—Equipment for the Chemical Process Industries," by Charles R. Harte, Jr. This complete summary tells where, and how wood may be used in chemical and process work, as well as a brief description of the erection of the tank itself. *Ind. & Eng. Chem.*, February, p176.

Water Purification. "Some Practical Aspects of Handling Chlorine," by Chris F. Bingham. Properties of chlorine, and difficulties attending its use in purifying of water are briefly discussed. *Water Works & Sewerage*, February, p37.

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Railroads Win "Door-to-Door Service" Decision

I. C. C., by a 6 to 4 decision, has refused to suspend tariff schedules proposed by railroads for pick-up and delivery service of less than carload traffic. Authorization carried with it permission to make an allowance to shippers and consignees of 5c a 100 lbs. if the latter elected to perform the pick-up for themselves. Three members of the Commission making up the Motor Carriers Division were against the majority. Commission's action immediately affects railroads serving an area comprising about one-third of the U. S. Railroads may also accept C.O.D. consignments. Pennsylvania announces that it will begin Apr. 1 a complete door-to-door service for less than carload freight between all points on its system at no additional cost.

A. A. C. Protests Sulfuric Acid Rate

Tank car freight rates on sulfuric between Alexandria and Covington, Va., were called "unjust, unreasonable and excessive" in a brief filed with the Virginia State Corporation Commission by the A. A. C. C. & O. and the Southern railways were named defendants in the case. Petition declared the Alexandria-Covington rates were unduly preferential to manufacturers located elsewhere, particularly those at Pulaski, Va.

I. C. C. Rules on Georgia Fertilizer Rates

On Feb. 3 the I. C. C. ordered all railroads to increase freight rates on fertilizer in Georgia to the level of the rates prevailing throughout the South, effective Mar. 5, '36.

Rubber Carboy Cushion Patent Granted

Carboy cushion of rubber, as well as the wooden box container employed with the rubber cushion (described in detail in the October issue of Chemical Industries, p361) have been patented, Patents 2,021,878 and 2,021,879 having been granted to Richard W. Lahey and Harry A. Kast, both of Cyanamid, and assigned to Cyanamid & Chemical.*

Expert Advice on Factory Transportation

Plant managers with factory transportation problems to solve can now have the expert advice of Transportation Engineer Harry B. Clapp who has joined the Clark Tructractor Co., Battle Creek, Mich., as consultant.

Economical Barrel Pump Marketed

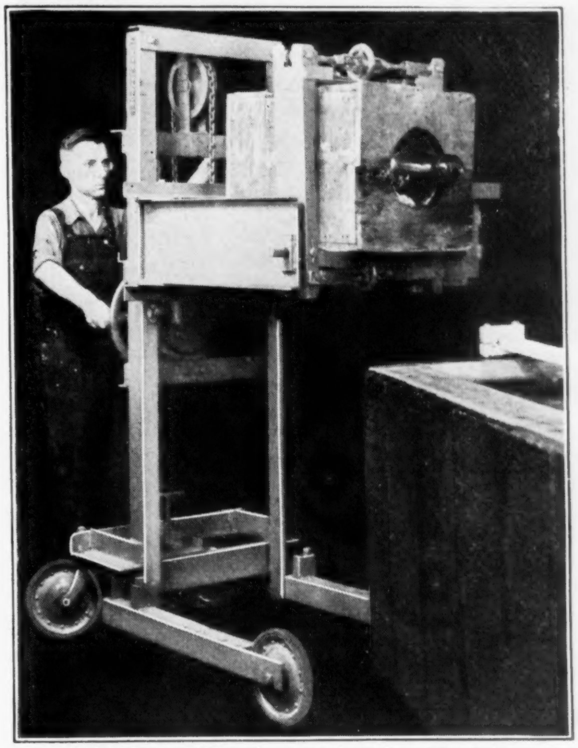
A new barrel pump to retail at less than $5 and that will handle oils, thinners, petroleum solvents, alcohol, etc., is now available through The Cleveland Brass Manufacturing Co., 4606 Hamilton ave., Cleveland. A piston-type pump of unusually simple construction, it operates easily, requires no polishing or priming, and a compression lever-lock faucet at the outlet end prevents after-dip and waste. A special alloy used in its construction is durable, rust-proof, and corrosion-proof; a suction pipe on the bottom provides complete drainage. It is especially adaptable to users of large quantities of liquids who transfer them frequently in small amounts.

Carboy Dumper Designed for Safety

The Revolvator carboy dumper was designed to take the place of men in emptying carboys into tanks, vats, etc. It is completely safe both for operator and carboy. Safe for the operator because he is always at the controls when dumping and thus away from any splashing. Safe for the carboy because positive gear drive in elevating, lowering and tilting completely controls movement of the carboy. Machine is self-loading, the platform straddling the carboy as the machine is pushed toward it. It is then but a second's work to twirl the 2 clamping wheels tight, thus locking the carboy securely in place.

* See page 291 this issue for a photograph of the carboy.

Large wheels, rubber tired, placed at each corner of the base, assure stability and ease of handling. In fact, it is but child's play to push the loaded machine around.



Safety to operator and carboy through unique design.

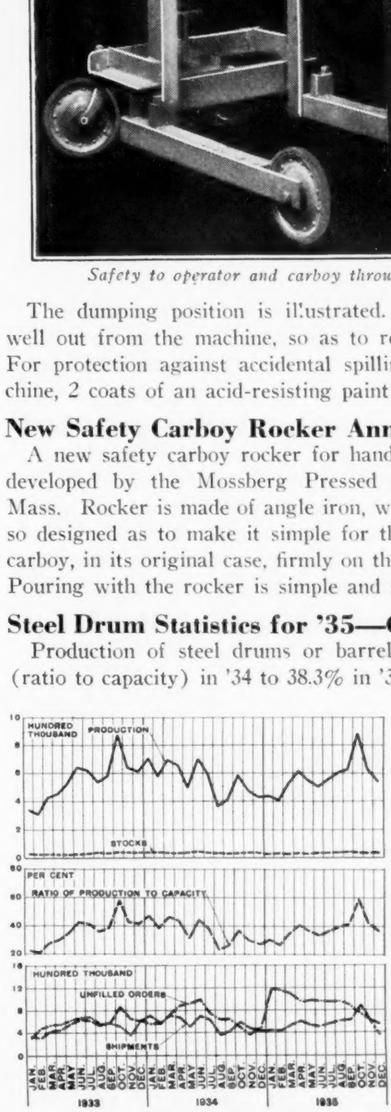
The dumping position is illustrated. The flow of liquid is well out from the machine, so as to readily pour into a tank. For protection against accidental spilling of acids on the machine, 2 coats of an acid-resisting paint are applied.

New Safety Carboy Rocker Announced

A new safety carboy rocker for handling chemicals has been developed by the Mossberg Pressed Steel Corp., Attleboro, Mass. Rocker is made of angle iron, welded at all joints. It is so designed as to make it simple for the operator to place the carboy, in its original case, firmly on the rocker, single handled. Pouring with the rocker is simple and safe.

Steel Drum Statistics for '35—Outlook for '36

Production of steel drums or barrels increased from 36.0% (ratio to capacity) in '34 to 38.3% in '35, according to statistics released by the Bureau of the Census and tabulated from reports of 31 manufacturers operating 36 plants. One producer closed down permanently in September. Total production for '35 reached 6,876,650 as against 6,677,322 in '34, while shipments amounted to 6,872,452 in '35 as against 6,682,400 in '34. Stocks at the year-end showed a slight gain in '35, the figures being 34,428 compared to 30,230. Manufacturers supplying information account for approximately 85% of the total value of the output in the industry in the '33 Census of Manufacturers. With stocks fairly low and the outlook for many industries, such as the chemical, petroleum, etc., particularly bright for '36, there is a strong possibility of some increase in the ratio of operation.

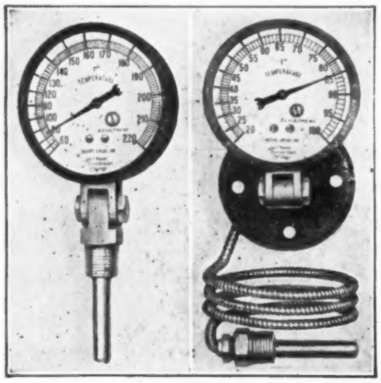


Statistical situation in steel drum production.

New Equipment

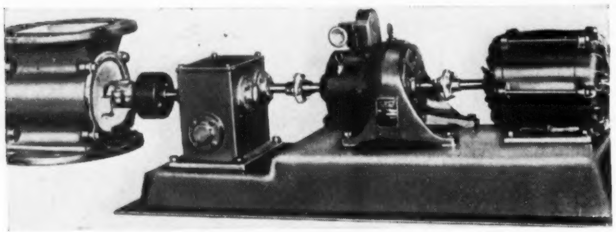
Socket Dial Thermometer QC 337

A new socket dial thermometer is now being manufactured in both the self-contained type and in the distant reading type. The self-contained instrument permits use of the one instrument as a vertical connection thermometer, a 90° back angle thermometer, a front angle thermometer or any intermediate angle. It eliminates requirement of specifying a specific type of stem for each particular application. This permits the dealer or the user to apply a single instrument of a given range to practically any installation. The distant reading thermometer is standard with 6′ of connecting tubing and a union bulb or, in the case of high temperature thermometers, either a union bulb or a flexible plain bulb. Thermometer has a mounting flange together with the universal socket which permits the installation of the instrument proper at any convenient point on top or in front of the apparatus or on a wall or pillar and then to install the bulb right at the point of temperature. A complete assortment of Fahrenheit scale ranges for all requirements from 20° below zero up to 800° above zero, or corresponding centigrade scales is available.



New Feeder for Process Industries QC 338

New variable speed positive paddle type feeder for the process industries has been developed with many features to recommend it. Designed for feeding very fine powdered products, it is dust tight. It is also corrosion proof, feeder unit being made of cast aluminum. Variable speed of feeder paddles from 2 R.P.M. to 20 R.P.M. is achieved by the use of a new departure transitory driving through a 200 to 1 double reduction speed reducing unit. Feeder is driven by a ½ H.P. explosion proof motor. Entire driving mechanism is mounted on a fabricated base, while the feeder unit is designed for fitting directly into a 12″ pipe line. Capacity of the feeder for each revolution is 121 cubic inches. Shipping weight is 316 lbs.



Paddle type feeder is dust tight even for very fine powders.

Colorimetric Testing Kits QC 339

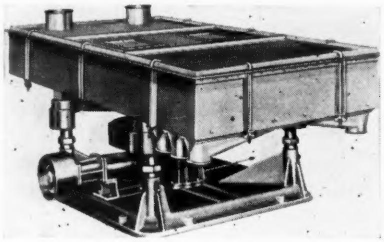
In addition to kits for making tests for hardness, alkalinity, CO_2, etc., 5 colorimetric-method outfits are announced, for (1) silica, (2) phosphate, (3) silica and phosphate, (4) oxygen, and (5) pH. A standard case (5¾″ x 4½″ x 7¼″) is used for all. Solutions are contained in small pipette stoppered bottles.

Small Versatile AC Motor QC 340

Engineers and chemists will find this small AC motor equipped with gear reductions suitable to attach mercury switches for all start and stop tests of electrical equipment; to obtain constant rotary, intermittent or tilting motions; to eliminate the expense of makeshift gear reductions; to rig up for mixing compounds and solutions. It is not a toy—all heavy cut gears—well built motor, and self-oiling at all wearing points.

Circular Motion Sifter QC 341

Roto Sifter, as its name suggests, is a machine that offers an improved way to produce accurate and distinct separations of a wide variety of products by passing the material over screens having uniform openings ranging from 2 to 250 meshes per lineal inch, depending on the type of product and upon the separations desired. Circular motion is acknowledged as one of the most efficient sifting motions, and in the Roto Sifter there has achieved a circular motion perfectly controlled that imparts this motion to every part of the sieve. Screen dead spots common in machines with end drives where circular motion prevails at one end and reciprocating at the other end are completely eliminated by the Rotor Sifter design with resultant efficiency in operation.



New Vacuum Deaërator QC 342

New vacuum deaërator has a series of convex and concave baffles arranged alternately so that the liquid will flow in thin films in such a way as to provide the maximum amount of exposed surface. Baffles are separated by spacer rings and can be removed very quickly for cleaning. Considerable space is provided in the upper part of the deaërating vessel to permit settling of foam, which is frequently produced when liquids are first exposed to high vacuum.

Vacuum is maintained by a steam jet evactor. Single-stage evactor produces a vacuum between 27.5 and 28.0″. When required, a 2-stage evactor is furnished to produce a vacuum up to 29.7″, except as limited by the vapor pressure of the liquid. A mechanical pump can also be used in plants where live steam is not available for the evactor.

New Line of Protected Motors QC 343

A new complete line of splash-proof, squirrel-cage motors in all ratings from ½ to 200 H. P. for constant and multi-speed, continuous or intermittent duty in all voltages and cycles, for any torque and starting current, has been announced. Construction provides protection to the inner parts from splash or spray and yet permits proper ventilation by small openings in the bottom of the end brackets for the air in-take, and louvres in the frame cover underneath the motor for the air exit.

Blower for Supplying Oxygen QC 344

A new "velocity type" blower, for supplying air to men wearing air-line masks in atmospheres deficient in oxygen, has been developed.

Chemical Industries,
25 Spruce St., N. Y. City.

I would like to receive more detailed information on the following equipment: (Kindly check those desired.)

QC 337	QC 341
" 338	" 342
" 339	" 343
" 340	" 344

Name ....

Title ....Company........................

Address ....

For the first time . . .

ANHYDROUS ALCOHOL

BY A

NEW PROCESS

USING

neither Benzol nor Alkali

Rossville Anhydrous Alcohol is now dehydrated with neutral salts by a new patented process which uses neither benzol nor alkali.

All types of fine Rossville Alcohols—pure and denatured—are available in this new anhydrous form.

Profit by the advantages of the improved anhydrous alcohol—Rossville Anhydrous Alcohol.

COMMERCIAL SOLVENTS CORPORATION
DISTILLERS OF FINE ROSSVILLE ALCOHOLS

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ROSSVILLE
THE SPIRIT OF THE NATION
ALCOHOL

SALES OFFICES and
WAREHOUSES IN
PRINCIPAL CITIES

Booklets & Catalogs

Chemicals

A628. Givaudan-Delawanna, Industrial Aromatics Div. January *Givaudanian* contains noteworthy article on oxidative deterioration and how this firm's stabilizers may check it.
A629. Givaudan-Delawanna. January *Givaudanian*, latest news of special interest to drug and cosmetic industries. Specialties producers should note items on anti-sunburn preparations and new fly spray odors.
A630. O. Hommel Co., Pittsburgh. February *Ceramic Forum* contains a noteworthy article on compounding and application of colored glazes, along with usual monthly news items of interest to ceramic industries.
A631. Innis, Speiden. February *Isco News* includes special notes on several Isco products, and complete, brief listing of all the Isco chemicals.
A632. Koppers Co., Pittsburgh. Products of Koppers and associated companies. A wide range of both organic and inorganic products as well as the company's chief product, fuel.
A633. Arthur R. Maas Chemical Laboratories, Los Angeles. *Chemistry & You*, Vol. 13, No. 1, features "The Test Tube for the Mystery Man," article warning necessity of analysis for so-called "trick" formulae.
A634. Milburn Co., Detroit. "The Cause and Prevention of Industrial Dermatitis," vital and valuable booklet of great current interest now being distributed by Pulmosan Safety Equipment, Brooklyn. Nine different type treatments are included with each cause listed according to the proper treatment.
A635. National Aniline & Chemical. January *Dyestuffs* contains complete list of 57 spring (1936) silk colors for fur felt hats, along with approximate formulae. Articles on dyes for coloring paper and screen printing are worthy of special note.
A636. Philadelphia Quartz. February *Silicate P's & Q's* tells the story of silicate use in chemical research.
A637. Sharples Solvents. Attractive 43-page booklet lists production methods, properties and industrial uses of pentasol and pent-acetate, widely used amyl solvents. A series of tables shows graphically the distillation ranges and evaporation rates of many alcohols and acetates.
A638. Southern Alkali, Corpus Christi, Tex. "The Products of Southern Alkali," attractive booklet containing short story of each product.
A639. Thiokol, Yardville, N. J. "Something New in Rubber—Something New in Plastics," attractive booklet announcing "Thiokol" molding powder, a synthetic rubber product fully vulcanized and compounded which can be formed in a press within 3 min. at 300°F.

Monthly Price Lists

A640. Fritzsche Bros. February Price List.
A641. Magnus, Mabee & Reynard. January-February Price List.
A642. Mallinckrodt. February Price List.
A643. Merck. February Price List.
A644. Monsanto. Complete listing of products of Monsanto and subsidiaries. Containers listed, but no price range.

Equipment

A645. American Foundry Equipment, Mishawaka, Ind. Folder No. 222 describes and illustrates American Dustube Collectors, recently developed dust collecting apparatus.
A646. Bausch & Lomb. "Micro-Projectors," time- and equipment-saving devices. Several types are described, specifications and uses also being given.
A647. Continental-Diamond Fibre Co., Newark, Del. This remarkably complete, strikingly illustrated booklet on Diamond Fibre hollow ware for boxes, trucks, cans, barrels, baskets and trays lists applications ranging from waste baskets to plant trucks. Almost any desired type truck or mill box is briefly described and illustrated. A really fine booklet on this type of materials handling equipment.
A648. The Debevoise Co., Brooklyn. Prevention and cure of erosion by the use of "Debecote" is described from standpoint of practical experience and results.
A649. Eppenbach, Inc., Long Island City, N. Y. Colloid mills for laboratory or industrial use described in booklet of this specialist in colloidal equipment.
A650. Fisher Scientific Co., Pittsburgh. *The Laboratory.* Vol. VII, No. 4, features "Salt, The Magic White Sand," an excellent study of this raw material. Several new miscellaneous pieces of laboratory equipment are also described.
A651. The B. F. Goodrich Co., Akron. "Cost Finding Record Book for Conveyor Belts." A valuable summary of engineering data on selection, installation and maintenance of conveyor belts. Of interest particularly to large chemical producers.
A652. Haynes Stellite, N. Y. City. "Haynes Stellited Valves," new 8-page booklet, points out advantages of hard facing the seating surfaces on steam valves, etc. Economy and wide range of application are clearly pictured.
A653. International Nickel of Canada, Copper Cliff, Ont. "The Nickel Industry in 1935," by Robert C. Stanley. Designed primarily for shareholders in this company, this booklet by the Int. Nickel president should be of great interest to any executive in the metal industry looking for a complete survey of last year's developments.
A654. International Printing Ink Research Labs. "A New Recording Spectrophotometer," by Arthur C. Hardy. Designed at M. I. T., first built by G. E. Reprinted from *Journal of the Optical Society of America*, Vol. 25, No. 9, Sept., '35.
A655. Jeffrey Mfg., Columbus, Ohio. Catalogue No. 417, complete and up to date information on many types of materials handling equipment. A valuable handbook, 400 pages.
A656. Leeds & Northrup, Philadelphia. Bulletin 709-B, "Micromax pH Recorder for Improved Gassing of Beet Juices," discusses improvements made in quality and uniformity of this product by close pH control. Full specifications of the instrument are included.
A657. Patterson Foundry & Machine. Electric process kettles, supplied in a variety of metals, and completely equipped with stirrers, flush valves, etc.
A658. Lewis-Shepard Co., Watertown, Mass. Rubber-tired hand trucks and portable elevators, new development of particular interest to chemical process industries.
A659. Pulmosan Industrial Safety Equipment, Brooklyn. Model respirators and parts described and specifications given.
A660. Pulmosan Industrial Safety Equipment. Type A dust respirator M-15. Approved by Bureau of Mines. Specifications for spare parts included.
A661. Pulmosan Industrial Safety Equipment. "Original Chippewa" safety shoes, important to process industry plant men. Several models are illustrated.
A662. Pyrometer Instrument Co., N. Y. City. New simplified optical Pyrometer. Instrument is self contained, and direct reading.
A663. Roots Connersville Blower, Connersville, Ind. Recent 4-page release describes small size inert gas unit with 1000 cu. ft./ hour capacity. Available in either electric motor or gas driven units.
A664. F. E. Schundler & Co., Long Island City, N. Y. "The Story of Golden Zonolite (expanded Vermiculite)—How It Is Making Insulation History." Attractive booklet lists properties, uses, and advantages of this new dual-control, loose-fill insulation material.
A665. Sherwin-Williams. "Sherwin-Williams Save-Lite, and Analysis of Plant Conditioning" pushes the better-light, better-sight program, important trend in plant reconditioning. Of particular importance to chemical industries where poor lighting in plants resulting in defective vision of workers may cause serious and expensive accidents.
A666. Struthers-Wells, Warren, Pa. Bulletin No. 76 describes the new lines of heat exchange equipment.
A667. Taylor Instrument, Rochester, N. Y. Booklet describing comparative performances of Taylor "Thermospeed" recording thermometers.
A668. Telco Products Ltd., London, England. Leaflet describes new valve position indicator. Other recent releases by this company are leaflets on sight check indicators and seat-in-sleeve valves.
A669. Harold E. Trent Co., Philadelphia. Electrically heated laboratory apparatus. Hot plates and laboratory furnaces illustrated and completely specified.
A670. Worthington Pump & Machinery. Deep well turbine pumps for nearly every purpose. Type QB. A striking folder worthy of high praise.
A671. Worthington Pump & Machinery. Horizontal duplex piston pumps for general services, valve plate style, renewable liner type, handling liquids up to 125 lb./sq. in Type VA.
A672. Worthington Pump & Machinery. Internal roller bearing, double helical Rotary Pumps. Type GR. For heavy duty and continuous service.
A673. Worthington Pump & Machinery. Internal sleeve bearing, double helical Rotary Pumps, Type GS. For handling wide range of liquids.
A674. Worthington Pump & Machinery. External ball bearing, double helical Rotary Pumps, Type GE. For use where separate bearing lubrication is desired.
A675. Worthington Pump & Machinery. Horizontal duplex piston pumps, turret type, handling liquids up to 72 lbs./sq. in. pressure. Type TA.
A676. Worthington Pump & Machinery. Worthington Diesel engines. Type D. Specifications and illustrations of Diesel installations are included.

Packaging

A677. Anchor Cap & Closure. Illustrations describe Anchor caps for almost any purpose, stressing the "Dressing Up" feature.
A678. Chase Bag. N. Y. City. February *Bagology* contains a clear review of the processing tax question and a brief summary of the situation in cotton and burlap.
A679. General Plastics. January-February Durez *Packaging News* describes trend toward novelty boxes of molded plastics for wide variety of products.

Received Late for Classification

A680. Commercial Solvents. February *Alcohol Talks*, titled "Crime, Science and Alcohol," tells alcohol's part in this thrilling new field of science.
A681. Consolidated Products—Spreckels Liquidation. Booklet listing equipment in the now-idle Spreckels refinery at Yonkers, N. Y. Entire plant has been maintained in good condition since shut-down and machinery and equipment are valued at nearly $10,000,000. Everything listed is offered for immediate delivery.
A682. Publicker Commercial Alcohol. New 76-page catalog lists properties and uses of various alcohols, esters, proprietary solvents, and ketones. For solvent or denaturing use.
A683. Republic Steel, Cleveland. "Corrosion of Air Conditioning Ducts," by Ralph W. Baker. Answers the question of the relation between increasing relative humidities in connection with air-conditioning ducts.
A684. Rolls Chemical, Buffalo. January-March *Retorts* contains handy reference list of all chemicals and raw materials handled by this firm. Containers for each product included.
A685. Voland & Sons, New Rochelle, N. Y. Precision balances and weights for student laboratory or industrial analytical use. Full specifications and prices plus illustrations of each balance leave no unanswered questions.
A686. The Beacon Co., Boston. This well-known producer of chemicals for emulsion production is bringing out new catalog, ready for distribution after about the 15th of March.
A687. H.S. Cover, South Bend, Ind. Series of short booklets giving descriptions and specifications for a line of respirators, goggles, etc., useful in the chemical process industries.

Chemical Industries,
25 Spruce Street,
New York City.
I would like to receive the following booklets; specify by number: ....

....
Name ....
Title ....
Company ....
Address ....
All information requested above *must* be given to receive attention.

How They Sell Furniture Polish in Chicago Stores

Another out-on-the-firing-line report on how different chemical specialties are being sold—or not sold—by various retail outlets. Such word-for-word accounts can tell any specialty manufacturer much of practical value in how to—or not to—get his own goods accepted by the consumers.

DEPARTMENT stores; hardware, grocery, and drug stores; the five-and-tens, and furniture stores; these are the chief retail outlets for furniture polish; and oddly enough, in Chicago at least, in the furniture stores (where one might at least expect a most intelligent sale of this item) the salesmanship is most indifferent. A shopping tour of Chicago's famous Loop has other surprises for the buyer of furniture polish and some revealing bits of useful data for the makers thereof.

To dispose of this furniture store trade first, let's take the best and most horrible example. One gathers at once that furniture stores are generally not interested in selling furniture polish, save in a few instances where they are selling a private brand of their own of reputed high merit and indubitable fancy price. But the usual attitude is better summed up by the fat little, sleek little, pert little clerk at Fish's who exclaimed:

"Furniture polish? Why we don't sell furniture polish: we sell furniture!"

"Well couldn't you recommend a good polish that doesn't make the furniture all gummy?"

"Really, I don't know anything about furniture polish," and then descending a peg or two, he admitted that in his own home they did use a well known popular brand you could buy in a drug store—Johnson's, he guessed it was.

This Firm Makes Their Own

Just a couple of doors below on Wabash Avenue, at Edwards-Zagel's, the same situation was handled more tactfully.

"No, I'm sorry we do not sell furniture polish. We make up our own in large quantities, but we do not sell it."

In answer to the query of what was in their polish, this tall, soft-spoken diplomat answered that it is chiefly lemon oil which, he added, is very expensive, but good. "Any good brand on the market should be satisfactory if properly used."

"But," he added, "don't buy cheap polish, and don't spare the elbow grease."

Grocery and hardware stores are concentrating in Chicago almost exclusively upon the nationally advertised brands—Johnson's Liquid Veneer, Boyle's Old English, and Three-in-One are the universal favorites in these trades if the survey of eight retail shops visited is a fair test. The salesmanship is uniformly quick and courteous but not very well posted on the whys and wherefores of a good furniture polish, and quite without suggestion as to its best use save for a parrot-like instruction to follow the instructions on the bottle. In some instances the clerk even took pains to read those directions, and the sound advice to clean well and rub thoroughly was also quite common. In the main, however, no effort is being made in these fields to push a certain brand, and the manufacturers selling through these trade channels must get their own customers, sell them, and bring them to the stores.

In the drug trade, on the other hand, there are private brands in the chain stores, and in the independent pharmacies a much greater proportion of local brands. Pretty plainly, the intra-store competition in the drug trade is both bitter and broken up. Most of the drug stores carry one or more of the national brands, but they stand side by side with a variety of less widely distributed makes, and noted among them were polishes made by Nu-Dex, Green's, Jlco, Furnital, Neverub, Wax-o-lite and Adna Products. One gathers the competition is more closely focused on price—at least, it was only in the drug stores that price was used as a sales argument.

But it is in the department stores that the furniture polishes really come into their own in the matter of both variety and display, although not in the matter of intelligent salesmanship. Field's and the Fair, Davis and the Boston store all carry in their housewares department really representative lines, and the experience at Mandel's is a fairly representative cross section of the big Loop stores.

Mandel's housewares are on the seventh floor and the furniture polishes along with floor waxes, metal polishes, rug cleaners, ammonia water, laundry soaps, paint and varnish removers—a whole long series of light blue shelves with quite a collection of household chemical specialties. It was not in the best location, but, once you found it, it was a most attractive display. While seeking, one could not but notice a special display of Sherwin-Williams paints, which included their floor and furniture polishes, but the demonstrator was out to lunch and the regular clerk made no reference to the S-W line. Likely enough, she didn't know it included polishes.

She was a pleasant-spoken young woman in a neat white and blue uniform, a little bit bored at the idea of selling an item she knew would not run over a dollar, yet courteous even when bombarded with questions to draw her out. She veered immediately away from the big display shelf and led the way to a table where there was a small attractive display of household specialties made by A. S. Boyle Co., including not only their two types of furniture polish, but also upholstery and rug cleaners. She proffered a fifty cent bottle of their Old English Furniture Polish.

"This is what we recommend," she said with a pleasant finality. "You don't need to rub this, because it cannot check or get greasy; but you should be sure that all the old wax and grease are removed before applying."

Answering an inquiry about the Cream Wax Polish, she volunteered the information that it was to be applied with a damp cloth. "No," she added, "you don't need to clean the wood first. You see, this is a sort of combined cleaner and polisher."

She did not know why this was not a better idea than a polish alone, and back again she came time after time to the other item, reiterating her pet arguments: "We recommend this" and "We sell most of this."

Applied Salesmanship

The big surprise came in Woolworth's gigantic store on State Street. It is well known that the five-and-ten theory of selling is to display well and let the customer do all the buying. Yet it was in Woolworth's that the best furniture polish salesmanship was found. The comparison is not altogether a fair one. For the outstandingly good salesmanship was on the part of a special demonstrator.

She was a friendly, middle-aged woman with brown hair and grey eyes that twinkled behind a pair of white-gold spectacles. She was selling—really selling—Wipe-on, under a painted sign that proclaimed "the varnish made from Bakelite." A mere pause in front of her counter was enough for her to call forth: "Let me show you how this works."

And she did. Demonstrating by pouring boiling water, by setting her red hot electric tea kettle down on a board, by

wiping out crayon marks, and finally by literally wiping on with a rag some of her preparation over a naked shingle of wood. All the while she kept up a pleasant, rapid fire of comment which was very much to the sales point and well filled with remarkably accurate facts.

"You know how hard it is to take out crayon marks," she said while demonstrating that point. "They are made of paraffin wax and carbon black, and they are used to mark shipping cases. Well, there you see, just a rub with a damp cloth and it comes off linoleum or furniture in a jiffy."

Her's was certainly a fine demonstration. A demonstration, too, of the selling value of the demonstrator in the retail store.

Chemical Analysis for New Scouring Agents

Chemical analysis is frequently advisable to supplement the more "practical" tests on new detergents and wetting agents, as these tests are difficult to devise and control in such manner as to represent practical working conditions.

These products, when sold at standard concentrations under known trade names, hardly need testing, but when used in mixtures or sold under assumed names there is some value in a general scheme of analysis for Gardinols, Igepons and similar products, intended for similar uses.

First, the moisture is determined by drying ten gm. samples in an oven for four hours at 100° C. The question of the loss of any volatile ingredient at this point may have special consideration, but such materials are not common in the agents under discussion.

The dried product is then dissolved in absolute alcohol and any insoluble material filtered off. This may include protein substances, starches or gums, and any inorganic salts. The latter may be subjected to the usual analysis methods for chlorides, sulfates, and phosphates, if desired.

Evaporate the alcohol from the filtrate and redissolve the residue in distilled water. Add excess barium chloride to throw down the barium salts of the sulfonates. Boil, allow a long time for the precipitation, and test the filtrate with more barium chloride to make sure that the reaction and precipitation are complete. Wash, dry and weigh for a good estimate of the amount of active materials.

Reflux another 5 or 10 gm. sample of the original material with 125 cc. of concentrated hydrochloric acid for two or three hours. This hydrolyzes the sulfuric acid ester group. The alcohol can be separated by ether extraction or by wet filtration. The latter is suggested in case of the formation of a difficultly separable emulsion by the ether.

With the Igepons there is hydrolysis at the ester grouping and liberation of free oleic acid. However, there is a subsequent reversal of the reaction and the sulfonic acid complex is salted out. The result from this method should check that from the barium chloride precipitation which is simpler.

Stability to hard water and the ability to prevent precipitation of insoluble soaps by hard water can be tested by general methods, but it is more practical to devise tests to fit the water in which the detergents are to be used. The agent can be put into the water at some practical concentration and standard soap added until there is a definite milkiness, or the soap can be added in sufficient amount to precipitate the hardness and a measured solution of the agent added until the precipitate is all redispersed

The combination of scouring tests, analysis and stability tests in comparison with known material gives a good basis for a selection. A chemical analysis of a single product will hardly be of much value unless carried on by someone experienced in this field.

The analysis cannot be greatly simplified and it cannot, in any form, entirely replace other types of tests for scouring, wetting, etc.

Other important data which are not easy to obtain include free fatty matter, the type of alcohol if the product is based on one of the higher alcohols, the position of the sulfate or sulfonic group as well as finding out which is present. The conditions of manufacture may in some cases detract from the quality of the product. F. C. Brown, *Textile Colorist*, p98.

New Complex Codling Moth Insecticide

New codling moth insecticide is made from calcium and iron arsenates, designed to supply an associated complex which would combine the adhesive qualities of the iron compound with the toxic properties of the calcium compound. Its solubility lies between that of the 2 components, and the concentration of soluble arsenic in a suspension saturated with carbon dioxide is about of the same order as that for lead arsenate. Therefore, it should prove to be less caustic to foliage than calcium arsenate. Tests have been started to determine the effect of this substance on foliage. At the present time this arsenical is adhering nicely and giving no perceptible burning. A fairly insoluble product has been obtained by coupling nicotine with one of the higher fatty acids. This compound should be non-toxic to man and merits trials to determine its insecticidal value. Thiocyanates are non-toxic to man in low concentrations such as are used in spray materials, and certain of these compounds are being synthesized. Their volatility is such that there can be no danger of a residue on the fruit. They have been found effective in the control of certain greenhouse pests such as aphids, mealy bugs, etc. Certain vegetable oils when used as sprays have given fairly good control of codling moth. Thiocyanates are soluble in these oils.

Tests and Results

Combinations of calcium arsenate, casein, gluten flour, petroleum oil, fish oil, and soybean oil have been tried in field tests for substitutes for lead arsenate. Combinations of oils and calcium arsenate were very injurious and the other combinations failed to give good control of codling moth. Hydrated lime, ferric oxide, ferric hydroxide, zinc hydroxide, iron sulfate-lime mixture, and casein were effective in reducing the arsenical injury which resulted from the use of calcium arsenate alone. Ferric hydroxide and iron sulfate-lime mixture possessed great adhesive qualities. Specially prepared zinc arsenate gave promise of good control of codling moth and caused very little burning. Soybean oil sprays of three-fourths and of 1% oil content gave excellent control of codling moth early in the season but failed to adequately control the last of the first brood and the second brood worms. No visible injury resulted from the 3 early-season applications but continued applications with hot, dry weather gave some yellowing and defoliation. Heavier oil applications caused considerable injury. *Missouri Agricultural Experiment Station Bulletin* 358, p.83.

Automobile Soap in Action

On the front of our Chemical Specialties insert is an interesting photograph of Amalie Olive Green Soap in Action. This new product of L. Sonneborn Sons, Inc., is an automobile soap, expertly made from carefully selected raw materials. It lathers and suds rapidly and easily in hard or soft water, hot, lukewarm or even cold.

Making Better Metal Polishes

Trends in Formulation Discussed

METAL polishes differ from those used upon furniture, floors, and automobile bodies in that an oxide or tarnish and foreign material are to be removed from the metallic surface to produce a clean, smooth one which will reflect light. Evidently an abrasive, a soap, and a vehicle consisting of some solvent or diluent, all compounded into convenient form for use, is all that is necessary. In fact, such a combination is the basis of the average metal polish with small amounts of chemicals which are introduced to exert a solvent action upon the oxides.

However, a wise choice of the basic materials cannot be made without first taking into consideration the types of metals and alloys to which they are to be applied. The more common ones are aluminum, copper, tin, chromium, nickel, silver, gold, platinum, pewter, steels, brass, bronze, and a few others of minor importance. These metals and alloys all differ in hardness, rapidity of tarnishing, and resistance to solvent action. Accordingly, a harsh abrasive will act rapidly upon one without appreciable harm, but will render another rough with the attendant difficulties of a poor lustre and finally permanent damage to the object which is being polished. The question of which chemicals are to be introduced for solvent action is an important one in that many are poisonous and should have been prohibited by law long ago.

The introduction of solvent chemicals is facilitated by the presence of water. As a result, we find the tendency in recent years towards low viscosity emulsions instead of the high viscosity paste type which must be sold in open top containers and do not flow freely when applied to vertical stationary objects. The former undergo changes upon standing, the most serious of which are hardening of the abrasive upon the bottom and separation of oil upon the top. They are impractical in every sense of the word and are commercially available only because one producer started selling at reduced prices and others had to follow suit.

The increasing use of metals and alloys in our office buildings, apartment houses, and residences has created a greater demand for satisfactory metal polishes. These must be easy to apply, easily removable subsequently without injury to the metal or other coated surfaces like varnish, lacquer, etc., and most important of all must do no injury to the person who applies them. But this demand has been met by pseudo scientists who get into the business with little capital and equipment and operate with one formula. Hence the need for a deeper insight into the merits of such products and at least three formulas each adapted to the needs of the different classes of metal.

Such products sell or unsell themselves by an examination of the mirror effect they produce upon a brass candlestick, a bronze door professional sign, or an aluminum cooking utensil. Thus, an intimate knowledge of a few principles of the behavior of light is of some service. It is outside the scope of this report to dwell at length upon the subject of light reflection, but a few remarks will not be out of place.

A lake surrounded by a forest and observed at twilight from a distant ledge will serve as an example. At one moment, a mirror image of the trees in the water is easily observable. A moment later it vanishes, due either to a gust of wind disrupting the reflecting surface or to a slight increase in intensity of light caused by the shifting of clouds from the few remaining rays of the setting sun. Hence the mirror effect is a function of the smoothness of the reflecting surface and the behavior of the light in which it is observed. Although the changes are not so abrupt when observing metallic surfaces, they manifest themselves especially in hallways of large buildings which are lighted even in daytime artificially, and to an increasing extent especially in urban districts where few stop to distinguish between natural and artificial light.

A surface which is perfectly smooth and free of foreign matter will reflect light regularly in that all reflected rays are propagated from the surface at the same angle; but indentations, tarnish, or even a film of difficultly removable oil and the mirror effect will be distorted accordingly. In many cases, the trouble can be traced directly to defects in the polishing compound and seldom to the method of application.

In view of the fact that all metallic articles are polished at the point of manufacture by mechanical means and that the executives of each plant have their own polishing compounds for use under high speed devices which are slightly different from those used by hand, the formulae submitted in the accompanying tables are for general commercial use where they are applied by hand and judged by a social group who are least capable of such an assignment.

A comparison of three typical patents granted in each of three decades and during the first half of the present one shows plainly that there has been little new thought in this field especially in the choice of abrasives, emulsifying agents, and salts which can exert a mild solvent action upon oxides; all of which have been made available in commercial forms of a wide diversity of properties. The paste type under 1 of the first decade and 1 of the third differ slightly and only in the introduction of natural products which may have become more plentiful in the course of twenty years, but not toward a more universally useful polish. The thinner emulsion type of the first decade differs slightly from that of the fourth in that the extremely poisonous potassium cyanide is substituted by ammonium fluoride and oleate which simultaneously give an alkaline reaction which forms soluble compounds with copper, nickel, silver, brass and bronze, and the oleate or oleic acid which is deposited with the abrasive acts as a lubricant and facilitates its removal from crevices, etc.

The presence of natural emulsifiers like vinegar, egg white, butter-milk, and onion water is an example of lack of scientific insight, especially in this day when a large group of emulsifiers of widely varying properties are available for sale. In some cases, claims have been granted in which the polish is expected to clean the surface and simultaneously deposit a fresh film of metal which equals in all respects to one deposited electrolytically. Such claims are preposterous and should be suppressed.

It is well known that many salts of metals form water soluble compounds of the complex type with acids, bases, and salts, the most important being potassium cyanide, ammonium hydroxide, sodium thiosulfate, potassium acid tartrate, citric, oxalic, hydrofluoric acids and their salts and the polysulfides. Their action in solution is instantaneous but their effect upon films of insoluble oxides during the short interval of application is questionable. We find one or more of these chemicals present in metal polishes and only the last item (polysulfides) has been omitted because of the bad odor and the formation of black sulfides. Assuming that they are beneficial singly, or present in pairs, only copper, tin, silver, bronze, nickel, brass, and pewter are affected which leaves steels, iron, aluminum and chromium for which special polishes should be made and a few are listed at the foot of the table of formulae.

Since this article will be supplemented by one with more specific instructions in a subsequent issue, the question of abrasives will be touched upon lightly. They may be divided into two classes which are natural and artificial; under the former of which are rotten stone, tripoli, pumice, emery, silica, gypsum, whiting, asbestos and other earths; under artificial ones there are lime, rouge, oxides of chromium and aluminum silicate.

Table Showing Developments of Metal Polish Formulas

1900-1910

1		2		3	
Tallow	6%	Ammonium Hydroxide	2%	Calcium Carbonate	25%
Paraffin	38%	Silica	20%	Cream of Tartar	2%
Bees Wax	6%	Naphtha	30%	Potassium Cyanide	8%
Turpentine	38%	Carbon Tetrachloride	40%	Silver Nitrate	3%
Pumice	12%	Stearin	8%	Clove Oil	4%
				Water	58%

1910-1920

1		2		3	
Water	73%	Ammonia	4.50%	Butter milk	27%
Whiting	20%	Acetic Acid	9.10%	Table salt	3%
Sodium Bicarbonate	4%	Oleic Acid	10.10%	Paraffin oil	27%
Ammonia	3%	Abrasive	22.70%	Turpentine	14%
		Ammonium Oxalate	2.90%	Alcohol	14%
		Water	50.70%	Water	14%
				Cedar Oil	1%

1920-1930

1		2		3	
Stearin	20%	Whiting	32%	Potassium Cyanide	23%
Coconut Oil	10%	Water	30%	Silver Nitrate	6%
Peanut Oil	10%	Ammonia	2%	Whiting	46%
Tripoli Powder	40%	Kerosene	30%	Water	25%
Paraffin	10%	Oleic acid	4%		
Petrol	10%	Lemon Oil	2%		

1930-1935

1		2		3	
Chromic Oxide	30%	Kerosene	8%	Kieselguhr	12%
Stearin	70%	Vinegar	2%	Talcum	12%
		Onion Water	80%	Ammonium Fluoride	4%
		Whiting	10%	Alcohol	6%
				Ammonium Oleate	6%
				Water	60%

Specialties

For Chromium	For Aluminum, Zinc, & Tin		For Chromium		For Iron	
No. 1 above	Sodium Phosphate	10%	Bauxite	30%	Alum dry	30%
	Sodium Carbonate	10%	Stearic Acid	10%	Aluminum Powder	20%
	Aluminum Sulfate	80%	Wax	10%	Silica	50%
			Soap	30%	Moisten before use.	
			Vaseline	20%		

The first criterion of such a material is the fracture which should be observed under the microscope and no matter how finely divided should be discarded if any sharp angles are observed. Since 200 mesh silica is commonly used, the introduction of one of the air floated earths is suggested up to at least 30% of the solid content because the oil absorption capacity is great and a more homogeneous mixture can be maintained. Since these products are being sold at wholesale prices of \$0.50 to \$0.70 per gallon, obviously an approximation to the ideal polish is hard to reach. However, remarkable results can be obtained and will be submitted later.

Uses of Paraffin Wax

Paraffin wax has many and varied uses because it has convenient melting points, will bend, and is tenacious at ordinary temperatures, does not deteriorate, is impervious to water at atmospheric temperatures, and has a high dielectric strength.

It is used extensively in the manufacture of candles; the impregnation of waxed papers; the coating of paper cartons (butter, cheese, ice cream), drinking cups, milk bottles, and milk-bottle tops; electrical insulation; waterproofing; the impregnation of match tips; floor and furniture polishes; laundering; the protection of preserves and jams from fermentation; coatings for cheeses to improve their appearance and to prevent mold, evaporation, and shrinkage; the lining of butter tubs; coatings for beer vats and barrels (vinegar, cider, alcohol, whiskey, molasses, and sauerkraut); coatings for meats, sausages, and other products which must be prevented from drying; protective wax dressings for burns; the manufacture of artificial flowers; etching glass; miners' lamps and marine bunker lights; waxing yarns in the textile industry; stuffing or loading for leather in tanneries; and for numerous other materials and purposes.

Bureau of Mines Bulletin 388, "Manufacture of Paraffin Wax from Petroleum," is for sale by the Superintendent of Documents, Washington, D. C., price 15 cents.

Lead arsenate, 3,000-4,000 metric tons, will be required for the '36 Brazilian cotton crop. Germany and Japan are expected to supply 75% and the balance will be made in Sao Paulo.

The More Common Agricultural Sprays

Product	Uses	Formulas	Production Notes
Lime Sulfur Spray—wet, dry ..	Contact Poison for certain scale insects; important fungicide for many fungus diseases—most important of the sulfur sprays, and used extensively on fruit trees. Often used in combination with lead arsenate or other arsenical; with nicotine sulfate or with both. For dormant spraying, scale clean-up, dry lime sulfur should be used at the rate of at least 60 lbs. to 100 gals.	FORMULA 1* Proportion of { Quicklime ...... 55 lbs.; Sulfur (finely ground or powdered) .. 100 lbs.; Water .... 50 gals. } FORMULA 2† Proportion of { Quicklime or / Hydrated Lime } 80 lbs. / 110 lbs.; Sulfur .... 160 lbs.; Water to make .. 50 gals. } * *Oregon Agricultural Experiment Station Bull. 336.* † *National Lime Association, Washington, D. C.*	Principal active ingredient is calcium polysulfide; average analysis for lime-sulfur solution, 32° Baumé, is calcium polysulfide 30½%, calcium thiosulfate 1½%, water 68%. Only fresh, high-grade quicklime should be used. Water is brought to a boil, then the lime is added and allowed to slake while the water is kept just below the boiling point. Sulfur is then added until no more will go into solution, usually around 32° Baumé (Sp. gr. 1.29), and the mixture brought to a boil quickly, and held there for 45 minutes with constant stirring. Hot water should be added to allow for evaporation losses. Finished product is allowed to cool and settle and the clear liquid drawn off and stored. For commercial material Baumé reading should be at least 30° at 60° F. Overboiling and underboiling and use of poor lime cause increase in sludge. In some plants the sulfur is mixed with the quicklime before slaking, or is added just after slaking starts. This is done in steel cooking tanks which are provided with agitators. After boiling, the mixture is allowed to settle or is filtered to remove the sludge, and is then either barrelled or is evaporated to dryness by either the vacuum process or atomized by compressed air into a warm chamber, heated air being admitted to carry off the steam. Cane sugar (1 to 5% by weight of the 33° Baumé liquid) is used in the manufacture of dry material to prevent decomposition. Calcium caseinate has a similar action.
Wettable Sulfur Summer Sprays	Considered one of the best summer fungicides. The old stand-by, self-boiled lime-sulfur mixture, consisting of lump quicklime, sulfur and water in the proportion of 8-8-50, has largely been superseded by "Wettable" sulfur sprays. Wettable sulfurs may be combined with lead arsenate, nicotine sulfate, and bordeaux mixture. Where foliage susceptible to injury is to be treated an excess of lime should be used.	FORMULA 1 (Proportions for 100 gals. of spray) Sulfur (superfine, passing through 300 mesh) .... 8 lbs. Hydrated lime .... 1 lb. Skim-milk .... 3 qts. FORMULA 2 (Proportions) Sulfur (Superfine) .... 50 lbs. Bentonite or other filler .... 10 lbs. Skim-milk, powder .... 3 lbs. Wetting agent .... 2 lbs. (6 to 10 lbs. of the mixture to 100 gals. of spray) FORMULA 3 (Proportions for 50 gals. of spray) Sulfur .... 8 lbs. Hydrated lime .... 4 lbs. Calcium caseinate .... ½ lb.	Formula 1 is a simple mixing operation and is a formula that is very often used by orchardists making up their own preparations. In Formula 2 if sensitive foliage is likely to be treated, hydrated lime should be incorporated in the formula. In all formulas the ingredients should first be sifted to remove all lumps, the skim-milk and/or wetting agents added and then thoroughly mixed in a dry mixer. Commercial brands often contain casein starch or glue as aids in wetting the sulfur when mixed with water, but the newer organic wetting agents are now greatly in favor.
Bordeaux Mixture	As a control of many fungus diseases of plants. Particularly effective for apple-tree anthracnose, peach-leaf curl, peach blight, potato late blight, celery blight, etc.	Commercial Bordeaux is usually sold under a 2-package system, one consisting of copper sulfate and the other high-grade hydrated lime to which has been added a very small percentage of casein or starch.	Two common faults with the 2-package system is that the copper sulfate sold is not finely ground enough and that old lime is often sold. If the lime-package is a "left-over" from the previous year's stock the user will obtain poor results.
Fish Oil Soaps (Potash)	Used extensively as an insecticide and also as a spreading agent for certain spray materials.	Proportion of { Fish oil .... 1 gal.; Caustic potash ... 1½ lbs.; Water .... 3 pints }	The caustic potash is dissolved in water. The fish oil is then added gradually with vigorous stirring. Then the mixture is finally heated for a short time with thorough stirring until the mass is uniformly smooth.

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Household Specialties

Urgent Action Needed on Legislative Matters

The National Association of Insecticide & Disinfectant Manufacturers is seriously concerned over several portions of Massachusetts House Bill No. 420 which comes up for hearing on Mar. 19th, and which is now in the hands of the Public Health Committee. Proposed bill loosely defines the word "chemicals" and would restrict to drug stores the sale of a large number of products now sold through other merchandising channels as well. There are other serious defects in the measure from the viewpoint of the chemical specialty manufacturer. Membership of the Public Health Committee is as follows: Representatives Jones of Barnstable (chairman), Alfred M. Bessette of New Bedford, Theberge of Fall River, Rolander of Worcester, Sweetser of Reading, Lodge of Beverly, Aspell of Boston, Lunney of Holyoke, Ashe of Lowell, Murphy of Peabody and Cleary of Auburn.

Bills Pending in New Jersey

New Jersey Assembly Bill No. 116 (now in the hands of the Committee on Public Health) would require any person engaged in fumigation or extermination to obtain a certificate of competency from the Dept. of Health, and a license to operate in a particular municipality where such is required by local ordinance. Moth proofing and termite control are included.

New Jersey Assembly Bill No. 118 would require a complete formula disclosure on the labels of all proprietary medicines, including all antiseptics and disinfectants which might be used on the body. There is a strong possibility that such a law might be interpreted to include all disinfectants.

California Adds Products to "Poison Law" Schedule

The California State Board of Pharmacy on Jan. 10th added fluorine compounds and derivatives and calcium cyanide to Schedule "B" of the Poison Law, and these products cannot now be sold legally without the official poison label and antidote.

Violations of the Federal Caustic Poison Act

Violations of the Caustic Poison Act sometimes involve products which would astonish even the authors of this Act, which is enforced by the Food and Drug Administration, a press release of the Dept. of Agriculture states. In the latest published list of judgments under the Act, 3 of the 8 cases reported dealt with toys. One was a balloon outfit which included a dangerous acid to be used in generating gas for the balloon. Two cases resulted in taking off the market miniature educational chemistry outfits that included dangerous chemicals.

This Act requires that certain caustic or corrosive substances and preparations containing them in a specified concentration shall be labeled to bear the word "Poison," suitable directions as to antidotes, the common name of the poison, and the name and address of the manufacturer, packer, seller, or distributor. The substances are hydrochloric, sulfuric, nitric, oxalic, carbolic, acetic, and hypochlorous acids, salts of oxalic acid, potassium hydroxide, sodium hydroxide, silver nitrate, and ammonia water.

Violations involved, the names of defendants or claimants, and the penalties imposed by the court follow:

For shipment of Champion Beer Pipe Cleaning Compound containing 31.8% of sodium hydroxide and not labeled with any of the markings required by the Act, the Slick Shine Co., Inc., Newark, N. J., was fined $25.

For shipment of Organic Cleanser containing hydrochloric acid without the warning labeling required by the Act, the U. S. Chemical Co., Greenville, Ohio, was fined $25.

For shipment of Apex Cresola Disinfectant containing more than 5% of carbolic acid and not labeled with the markings required by the law, the Apex Soap & Sanitary Corp., Pittsburgh, Pa., was fined $50.

In the following instances failure to label with the "Poison" warning and with some, or all, of the other markings required by the Caustic Poison Act, resulted in the seizure of shipments and subsequent judgment of condemnation by the courts and destruction of the goods:

Shipment by Allied Engineering Products Co. from San Francisco to Portland, Oregon, of Skasol which contained more than 10% of hydrochloric acid; shipment by the Midgetlab Co. of St. Louis to Chicago of a set of chemicals including sulfuric acid; shipment by Thornecraft, Inc., of Chicago to New Orleans, of "Buck Rogers Strat-O-Sphere Dispatch Balloon," which had in the package a quantity of sodium bisulfate containing 36.24% free and chemically unneutralized sulfuric acid; shipment by Eugene, Ltd., from N. Y. City to Philadelphia of Eugene Steam Sachets containing ammonia; shipment by the A. C. Gilbert Co. from New Haven, Conn., to N. Y. City of acetic acid, sodium bisulfate and ammonia. Court adjudged substances misbranded and released the chemistry outfit sets under bond conditioned that the poisonous substances be removed from the sets.

Federal Trade Commission Continues Drive

F.T.C.'s drive against alleged misleading statements by chemical specialty makers was renewed last month. Strong, Carlisle & Hammond, Cleveland, manufacturer of "Sib", a sodium hypochlorite solution, is accused of unfair representations in advertising matter and radio announcements.

Advertising Plans Reported

Swift & Co. is sponsoring something brand new in radio programs for its Sunbrite Cleanser. In the wake of parental criticism of much of the radio fare for children, Swift is experimenting with the "Sunbrite Junior Nurse Corps" series founded on study of child psychology and vocational interests of girls. Angelo Patri, authority in child training, has been retained as supervisor of scripts.

Manhattan Soap, N. Y. City, is again advertising Sweetheart soap and flakes after a 5-year lull. Campaign broke late in February in 540-line space in 14 papers of New York, Newark, Bridgeport, New Haven, Hartford. Providence and Philadelphia.

Total circulation for the campaign, which will promote a contest offering Bermuda trips and $1,700 in cash and merchandise prizes, will be more than 25,000,000, it was explained. Four evening, one morning and 3 Jewish newspapers here are included. Schedule per paper will be 2,160 lines. Some spot radio is being used now.

Contest, to end June 1, will be for the best "reasons for using Sweetheart soap." Silverware and other premiums also will be offered in the copy.

Manhattan soap has national distribution, it was pointed out, and newspapers in other markets probably will be used this year.

B. Carmen, sales manager of the company, is in charge of advertising.

The Gold Dust Corp. promises largest advertising campaign ever devoted to a shoe preparation to introduce its new Shinola White Cleaner. Double-your-money-back theme is to be stressed. New cleaner will be marketed in both bottle and tubes with a 10c and 25c size obtainable in each style of container.

P. & G. is launching a series of broadcasts in 7 far-western states. Valuable prizes will be given for the best answers to the question, "Why I need both large and medium sizes of Ivory soap in my home?"

Sapolio, famous cleanser in the early part of the century, is staging a "comeback." Enoch Morgan's Sons has just "O.K.'d" 1st of a series of test advertising campaigns to be followed later by a large-scale national campaign. Advertising theme is built around "Spotless Town" jingles.

Oakite is preparing an ambitious spring cleaning campaign for its packaged cleanser. Newspapers and possibly radio enter-

tainment will be used, and about 500,000 samples will be distributed during the year.

Campaigns in newspapers and radio in New England, and in newspapers, radio and sampling in the Chicago area are now under way. About 25 major markets will be included in '36 which will represent an increase of about 50% from '35. Calkins & Holden, N. Y. City, is the agency; J. Sherwood Smith, vice-president, is in charge.

Exterminators Consider "Clinics"

National Association of Exterminators & Fumigators' officers are considering the possibility of holding several "clinics" in connection with the annual convention scheduled for Oct. 26-28 in Cleveland. There is also the possibility of having an exhibit of advertising material, office forms, etc. Members are being asked to comment.

News of the Companies

Fuld Bros., Baltimore manufacturer of private brands of household specialties, is now retailing a water emulsion floor wax, "Perma-Glo."

Bennett Janitor & Chemical Supply Co., San Diego, is moving into larger quarters at 1067 Front st.

Continental Car-na-var Corp. has just adopted a 5-gal. steel pail package of floor wax for large users.

P. & G. is taking over Oxene Products, and moving Dayton equipment to Cincinnati.

Pyrethrum and Derris Cultivation

Pyrethrum and derris cultivation is receiving attention in many parts of the world. Agricultural Experiment Station at Tucuman, Argentina, reports successful introduction of the former, and the East African Agricultural Research Station at Amani, Tanganyika Territory, is growing roots of the latter with contents of around 20% of total ether extract and 9% of rotenone. Also, increased interest in derris cultivation is noted in the Federated Malay States. Export prices of roots from that country have increased 75% since early '34.

Consider the Egyptian Shoe Polish Market

Egyptian shoe polish imports reach about $125,000 worth of foreign shoe polishes yearly, 60% of which come from the United Kingdom, 30% from the U. S. and much of the remainder from Italy and other European countries. Local competition is encountered from domestic firms, owned by Armenians, who sell their product in bulk or bottles at exceptionally low prices, some bottles selling as low as 2½c, and although of very poor quality, price is a determining factor in this market.

Merchandising Specialties

Woolworth Experiments with Higher Prices

Many chemical specialty manufacturers will learn with interest that at least one of the 5 & 10 chains, Woolworth, is definitely experimenting with higher top prices, possibly 40c or 50c. Present series of tests being conducted include articles priced at 25c, 35c, 40c, and 50c. These articles have been placed on sale in a few stores in key cities throughout the country. Results will be carefully watched.

Many specialties do not lend themselves to being packaged in such small quantities that they can be profitably merchandised at 5 or 10¢ prices; many chemical specialty manufacturers have shied away from the chains for this reason in the past, but if the Woolworth experiment proves successful, the attractiveness of such merchandising channels will be greatly enhanced.

Industrial Specialties

Effect of Light on Hypochlorite Solutions

Concentrated sodium hypochlorite solutions are seriously affected by light and decompose into sodium chloride and oxygen. In one experiment, 60% of the hypochlorite was destroyed in 27 days. Rise in temperature has only a very slight effect on this type of decomposition, but when decomposition comprising change of the hypochlorite into chlorite and chlorate is considered, temperature is the controlling factor, influence of light being negligible. Dilute solutions decompose more rapidly than concentrated solutions. Conclusion is drawn that it is advisable to store concentrated hypochlorite solutions out of contact with light, and only to produce dilute solutions immediately before use. Jacquemain & Doll, *Bulletin Soc. Chim.*, France, Oct., '35.

Paint Mildew Preventive Formula

A mildew preventive consisting of 73.8% by weight of zinc oxide, 1.2% by weight of bichloride of mercury, and 25% by weight of linseed oil, forming a smooth, easily workable paste for use by painters, is suggested in *Paint, Oil & Chemical Review*, Feb. 6th, p14. Such pastes should of course, bear the proper warning labels.

Foreign Phosphate Detergent Formula

A phosphate detergent formula is reported in English Patent 436,332 ('34) in which 1 mol. trisodium phosphate, 4 mol. of sodium acetate or 1 mol. of sodium carbonate, or with 4 mol. of borax and 1 mol. of sodium carbonate are the ingredients.

Fumigation of Tobacco

Ethylene oxide, one part, and carbon dioxide, 6.5 parts, is suggested for fumigation of tobacco bales, carried out in vacuum if possible. Melis & Lepiore, *Revue Internationale des Tobacs.*

British Glue Standards Issued

British Standards Institution has just issued a series of British standard methods for the testing of bone, skin and fish glues. Tests include methods for the determination of moisture content, jelly strength, viscosity, melting point, foam, water absorption, keeping quality, joint strength in shear, reaction, grease, ash, sulfur dioxide and chlorides. Relative importance of the tests described must necessarily depend largely on the purposes for which the glue is intended. Copies (B.S. No. 647-1935) may be obtained from the Publications Dept., British Standards Institution, 28 Victoria st., London, S. W. 1, price 3*s.* 8*d.*, including postage.

Company Notes

Waterside Milling, Tacoma manufacturer of soybean glues, will erect a $75,000 plant to replace one recently destroyed by fire.

"Don't Apologize-Calgonize" is the slogan Calgon, Inc., Pittsburgh detergent maker, is employing in new advertising campaign.

Ace Chemical's offices are now at 2nd and Main sts., Cincinnati. Company plans another building for manufacture of brewer's coatings and finishes.

Personal Items

S. Bayard Colgate, Colgate-Palmolive-Peet president, is the new head of the Association of American Soap and Glycerine Producers.

Eugene R. Manning, former head of Clemson College's textile chemistry department, will now do laboratory and sales development work for E. F. Houghton & Co., Philadelphia, on chemicals for the textile industry.

Agricultural Specialties

The Question of Filler Cost in Fertilizers

Farmers can save money in the purchase of fertilizers, if they take full advantage of their opportunities, says the U. S. Department of Agriculture. For example, use of filler in making mixed fertilizers in the '34 season cost the farmers of 7 Southern States alone the sum of $5,500,000, an average of $2.19 on every ton of mixed fertilizer bought.

Dolomite has a considerable value when used as a fertilizer filler in neutralizing the acidity that certain fertilizer ingredients produce in the soil and in supplying magnesium. Untreated phosphate rock also is of value in supplying slowly available phosphoric acid. Amounts of these materials used as filler in the year studied were worth at retail prices 36c per ton of mixed fertilizer. This leaves $1.83 as the price paid for sand in the average ton of fertilizer.

Mixed fertilizers containing less than 16% of plant food, for example the 3-8-3 grade, cannot ordinarily be made from the materials available at present without the use of considerable filler. As long as consumers ask for such grades they will be manufactured. A few years ago such grades were the best that could be made, but today through economic changes they are not.

Fertilizer producers have taken exception to this press release of the Dept. of Agriculture. They contend that they are anxious to produce as highly a concentrated fertilizer as possible but that southern farmers refuse to pay for higher than 14% concentration and that the problem of educating users to 16-22% concentration is a difficult one. Manufacturers also point out that in the last 10 years the use of filler has decreased for the average plant food content has increased from 12 to about 17%.

Chinch Bug Insecticides Studied

Chinch Bug insecticides can be used economically only as line barriers or for killing the bugs on the 1st few rows of corn. Crude creosote and crude naphthalene have proved to be the most effective repellants for use as barriers. Addition of calcium cyanide to crude creosote, gas tar or crank case oil, with the view of gassing the bugs as they moved along the barrier, proved of no value. However, one-half oz. to one oz. of calcium cyanide flakes sprinkled at right angles to the barrier line every rod or 2 proved very effective in killing the bugs which crawl along the oil line. Discarded crank case oil fortified with different quantities of creosote and naphthalene were ineffective as a barrier. One oz. of 40% nicotine sulfate properly mixed with 1 lb. of hydrate lime was an effective, safe, and reasonably economical dust for killing the bugs on the first few rows of corn. Powdered calcium cyanide and oil emulsion also have been used. However, they were less safe and less effective. *Missouri Agricultural Experiment Station Bulletin* 358, p69.

Sulfur Bricks for Weed Control

Bricks made out of sulfur and sand when used in sidewalks in gardens, etc., completely eradicated nutgrass. Such bricks were also used as borders around flower beds to prevent encroachment of nutgrass. Bricks were made by the Texas Gulf Sulphur Co. *Texas Agricultural Experiment Station, 47th annual report*, '34, p92.

Improved Form of Cryolite for Bean Beetles

Bean beetles can now be controlled as easily as potato bugs through the use of an improved form of cryolite (light, fluffy form), produced by the Aluminum Ore Co., East St. Louis, Ill. Spray tests appear to give better results (1½ lbs. cryolite to 50 gal. of water). It may also be used in the dust form with the following proportions of 1 part cryolite, 3 parts sulfur. University of Tennessee Agricultural Experiment Station, Knoxville, Circular No. 56, January, '36.

Official Tolerances for '36 Announced

Official tolerances of residues from the use of poisonous insecticidal sprays on fruits and vegetables will be the same during '36 as they were in '35. These are:—Lead, 0.018 grain per lb.; arsenic trioxide, 0.01 grain per lb.; fluorine, 0.01 grain per lb.

Control of Weeds in Waste Areas

Arsenic in the form of sodium arsenite is effective for controlling weeds in waste areas in dosages of from 2 to 8 lbs. per sq. rod. Sodium chlorate under certain conditions is effective against annuals for more than one year. Dry mixture of sodium chlorate and arsenic trioxide applied in late winter is effective for long periods, the proportion of the 2 depending upon the soil type and weeds encountered. *California Agricultural Department Monthly Bulletin* 24 ('35), No. 4-6, p247-259.

Chemicals Employed in Termite Work

Termite insecticides fall into 3 classifications, 1st, to protect against attack; 2nd, to treat the soil; 3rd, for killing termites when they come in contact with it. Sodium arsenite, arsenate of lead, fluorines, and other stomach poisons have been used to poison termites. Creosote, paradichlorobenzene, orthodichlorobenzene, crude naphthalene and other materials have been used as repellants with good results in treating both timber and soil. *Missouri Agricultural Experiment Station Bulletin* 358, p70.

Raw Linseed Oil for Woolly Aphis

Woolly aphis is controlled by spraying trees with a mixture of raw linseed oil and water. *Union of South Africa Agricultural Department Bulletin* 125 ('34), p23.

Calcium Arsenate vs. Lead Arsenate

Codling moth control trials with calcium arsenate in place of lead arsenate gave encouraging results although difficulties were encountered late in the season because of the poorer adhesion of the former. Calcium arsenate when applied with proper safeners, such as zinc sulfate or aluminum sulfate, was found of equivalent value to straight lead arsenate. Most promising formula is calcium arsenate 4 lbs.; hydrated lime 2 lbs.; zinc sulfate 1 lb., and water 100 gal. Work done at the Washington Experiment Station and reported in *Better Fruit*, '30 ('35), No. 4, p5-6.

Wetting Agents in Chemical Weed Killers

Wetting agents in weed-spraying liquids appear to increase the efficiency of chemical weed killers, according to preliminary work done by Engledow & Woodman at the School of Agriculture, Cambridge, England, and published in the *Journal of the Ministry of Agriculture*, Oct., '35. Such products as ammonium caseinate or ammonium soaps might be found to show both toxic and wetting powers, report indicates.

New Fertilizer in Rod Form

"Fertilsticks"—pulverized sheep manure pressed in rods similar to fireworks punk, and deodorized by a secret process, will shortly be put on the market by Henry Weitz, Morris, Ill.

Niagara Sprayer Builds Acid Plant

Niagara Sprayer & Chemical, Lockport, N. Y., has just completed a large acid plant in anticipation of the best season in years.

Miller Joins Florida Agricultural Supply

Ralph L. Miller, entomologist with Freeport Sulphur, resigns to do development work on insecticides and fungicides for Florida Agricultural Supply at Orlando.

Packaging, Handling and Shipping

Chemical Specialty Packages Win Outstanding Recognition in Both the Wolf Awards Competition and Modern Packaging's All-America Contest—

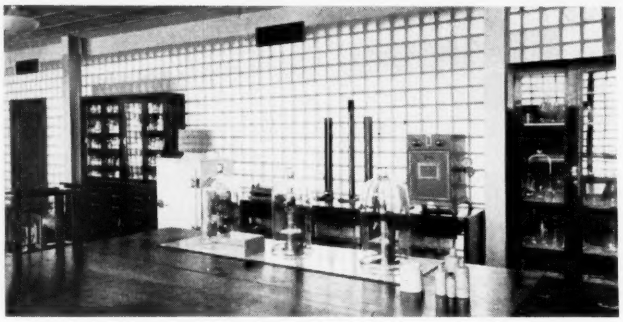
The Five Star Anti-Freeze container entered and used by du Pont, and designed by Jim Nash, took 1st honors in the '35-'36 Irwin D. Wolf Awards Competition for distinctive merit in packaging. The American Management Association is the sponsoring organization for this annual competition. The du Pont anti-freeze container was awarded the Irwin D. Wolf trophy, consisting of 2 Dirigold Vases, and other honors were awarded in 16 merchandising classifications by a jury including: Gordon Aymar, art director, Blackman Advertising, Inc.; Richard Bach, director of industrial relations, Metropolitan Museum of Art; Edith M. Barber, writer and consultant on home economics; James C. Boudreau, Art Department, Pratt Institute; Berent Friele, president, American Coffee Corp.; Alice Hughes, feature writer, *N. Y. American*; Ray M. Schmitz, associate merchandising manager, General Foods Corp.; Jack Straus, vice-president, R. H. Macy & Co., Inc.; William Weintraub, *Esquire*.

Several chemical specialty packages were among the group winners. Johnson's Furniture Polish, entered by S. C. Johnson & Son and Owens-Illinois Glass, and designed by E. W. Jones, of Needham, Louis & Brorby and Owens-Illinois Glass, was selected as the outstanding example of the "Most effective use of more than one color"; Pacific Coast Borax's "Boraxo" package was awarded 1st prize in 2 groups. "The most effective use of the elements of design to create shelf visibility in the retail stores," and "The most effective redesigned package (based on a comparison of old package with new)." In the latter group honorable mentions were given to Hercules Powder's steam-distilled wood turpentine container, designed by Theodore Marvin, Hercules' advertising manager, and to Hewitt Soap Co., for its Hewitt's Dog Soap container, entered by Martin F. Schultes, and designed by H. P. Kurth.

In the group "The most effective use of merchandising ingenuity regardless of artistic qualities," a match box (for ink color matching) used by International Printing Ink, and designed by John M. Calkins, was awarded 1st prize, and honorable mention went to the brush display entered and used by Sherwin-Williams and designed by American Can. Standard Oil of Ohio's "Sohio Cleaning Fuid," entered by Aluminum Steel Co., received honorable mention in the group "The most effective package designed to aid consumer convenience regardless of artistic qualities."

DuPont's "Five Star" Anti-freeze container was also the winner in the classification, "The most effective use of layout and/or decorative design, with particular emphasis on both merchandising value and beauty," and honorable mention awards were given to Johnson's "Furniture Polish" and to "Semdac Liquid Glass" entered by Camera, Inc., used by Standard of Indiana, and designed by Andrew Henkel.

"Stop Spot Handy Cleaner," entered and used by Union Oil of California, designed by Frederick Sykes, was the group winner in the classification, "The most effective use of 2 or more packaging materials in one package." The "Aero Carboy" (described exclusively in CHEMICAL INDUSTRIES in October, '35) entered by American Cyanamid, and designed by R. W. Lahey and K. M. Sieg, won 1st place in the group, "The most effective use of inventive genius in package construction," while in the "Floor display pieces that most effectively contribute to the selling of the unit package," the floor display stand of Lever Bros., and designed by Hinde & Dauche Paper, was the winner.



Interior view of the 1st all-glass windowless building which houses the packaging research laboratory of Owens-Illinois Glass.

Modern Packaging Awards Announced

Chemical specialty packages likewise in "The 1935 All-America Package Competition Gold Awards," conducted by *Modern Packaging*, won several important places, indicating the high standards in packaging design often found in the chemical specialty field. Stanco's "Garden Flit" package was 1st in the fibre can group, Fel's new soap chip box 1st in the wrappings group, U. S. Manufacturing Corp.'s "Fountain Cleaner Refill" 1st in the miscellaneous packages classification, Cyanamid's carboy 1st in the shipping container classification. Three-In-One Oil's new furniture polish carton won a bronze award in the folding carton section.

Winning Packages Previously Shown

Nearly all of the chemical specialty packages honored in both recent contests have been shown in the past months on the New Products-New Packages page of CHEMICAL INDUSTRIES, and for those readers who would like to recall what they look like the dates are given below:*

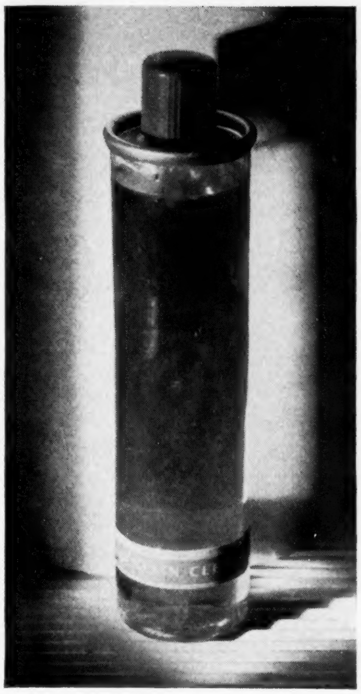
DuPont's "Five-Star" Anti-Freeze	November,	'35,	p. 465
Johnson's Furniture Polish	January,	'36,	p. 63
Pacific Coast Borax's "Boraxo"	December,	'35,	p. 603
Union Oil's "Stop Spot Cleaner"	February,	'36,	p. 179
Stanco's "Garden Flit"	July,	'35,	p. 81
Three-In-One Oil's Furniture Polish Carton	May,	'35,	p. 450
Cyanamid's Carboy	October,	'35,	p. 361

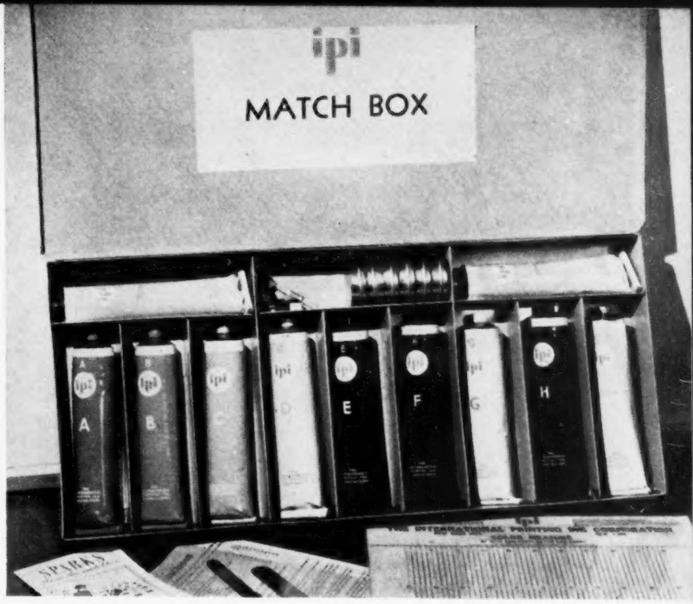
Portable Screw Capping Machine

A new simplified portable screw capping machine has just been introduced by Alsop Engineering. New unit is instantly adjustable for tightening screw caps of all types with positive security, making every container absolutely airtight. It eliminates all danger of leaky bottles and spoiled shipments often caused by haphazard capping methods. Flexible shaft allows the operator to cap bottles within a large radius of the base.

* *On the opposite page several of the entries not previously shown in* CHEMICAL INDUSTRIES *are reproduced. Details of the packaging "Clinics" held in conjunction with the Wolf Competition will be reported on in the April issue.*

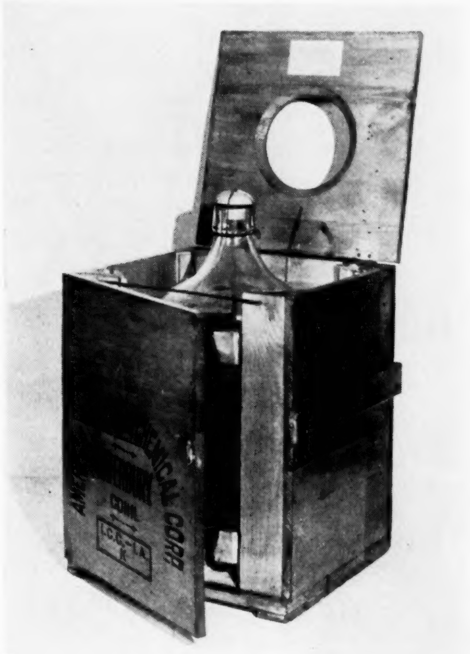
New Products—
New Packages



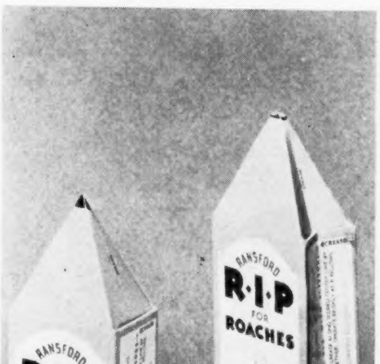


Left, Match Box (for color matching) used by International Printing Ink, and designed by John M. Calkins, won 1st place in the group, "The most effective use of merchandising ingenuity regardless of artistic qualities," in the recent Wolf Awards Packaging Competition, sponsored by the American Management Association. Below, the Cyanamid carboy, designed by R. W. Lahey and K. M. Sieg, which won the prize in the group, "The most effective use of inventive genius in package construction." The carboy was also awarded the gold medal in the shipping container section of *Modern Packaging's* recent All-America Competition. Right, the Lever Bros. floor display, designed by Hinde & Dauch Paper Co., winner in the group, "Floor display pieces that most effectively contribute to the selling of the unit package."

Above, the "Fountain Cleaner Refill package of the U. S. Manufacturing Corp."—gold medal winner in the miscellaneous packages section of the recent Modern Packaging All-America Competition, sponsored annually by the magazine *Modern Packaging*.



Ransford Insecticide, Worcester, Mass., is marketing its "R-I-P for Roaches" in a re-designed package. Center, Gunk, a product of The Curran Corp., Somerville, Mass., is a grease solvent. Mixed with kerosene, it dissolves grease, oil and grime, turning them into a form of soap which may be removed by washing with cold water. Forms stable oil-water emulsions with mineral oils and grease. Also recommended for cleaning laboratory glassware of mineral oils. Right, two new floor waxes on the market, Wilbert's "No-Rub Floor Wax," put out by Wilbert Products, N.Y. City, and "Ultra Gloss No Rub Wax," marketed by Ultra Chemical, Paterson, N. J.



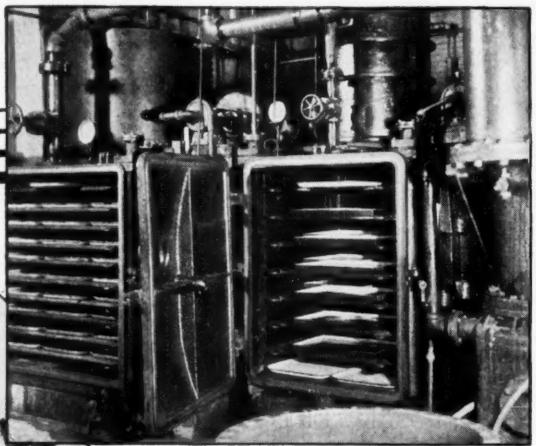
Master Craftsmen of CHEMISTRY —

NO. 4 OF A SERIES
of advertisements portraying the men and the methods responsible for the excellence of the products manufactured by Mallinckrodt Chemical Works.

AUGUST BRUENING

Mr. August Bruening has been employed in the production of Iron Salts in the Mallinckrodt plant for 37 years.

"THE SCHOOL OF EXPERIENCE TRAINS MEN TO BE MASTERS"



VACUUM DRYING OVENS

Yard vista in Mallinckrodt plant near point where tons of iron salts annually start their journey to thousands of pharmacies.

Iron Salts
(MALLINCKRODT)

UNIFORMLY excellent physical characteristics are, next to true chemical structure, the most important factors to be considered in the production of superlatively fine salts of iron.

Here again, the skilled technic and long experience of the Mallinckrodt Master Craftsmen of Chemistry perform highly important functions. No machine ever devised can compete with human skill and experience in operation of the various processes—from the iron-acid solution to the end-product in the form of uniform-sized freely soluble "pearls" or fine iridescent "scales". Each Mallinckrodt iron salt must pass a series of exacting tests and live up to the highest uncompromising Mallinckrodt standards of quality before the M. C. W. label is affixed over its container.

Mallinckrodt Iron and Ammonium Citrate (M. C. W.) (Soluble Ferric Citrate)

Mallinckrodt Iron and Ammonium Citrate U. S. P. Brown Pearls, for example, give dark, rich solutions of uniform iron content. It is a free-running granular product which does not cake. Readily soluble and practically non-deliquescent. As perfectly uniform in chemical and physical characteristics as the finest chemical engineering skill can produce. M. C. W. Iron and Ammonium Citrate is also available as Green Pearls, U. S. P. Brown Scales, U. S. P. Brown Powder and Green Scales.

Other Mallinckrodt Iron Products

Iron Carbonate Saccharated U.S.P.
Iron Glycerophosphate N.F. (Powder & Scales)
Iron Pyrophosphate N.F. Pearls
Iron Pyrophosphate N.F. Powdered
Iron Hypophosphite N.F. (Ferric)
Iron Oxide Saccharated
Iron & Quinine Citrate (Ferric)
Iron Reduced U.S.P.
Iron Citrate U.S.P. VIII (Ferric) (Pearls & Powder)
Iron Chloride Solution U.S.P.
Iron Chloride Tincture U.S.P.

11th ANNUAL TRADE DINNER this year is to be held at the Hotel Waldorf-Astoria on Thursday, March 19, under the auspices of the Drug, Chemical and Allied Trades Section of the New York Board of Trade. Be sure to come!

ST. LOUIS
CHICAGO
PHILADELPHIA

Mallinckrodt
CHEMICAL WORKS

NEW YORK
MONTREAL
TORONTO

FINE PRESCRIPTION CHEMICALS

New Trade Marks of the Month

350,634
Softasilk

359,967
RHOSILLE

360,220
Palm Beach

364,533
ACE STORES

365,451
FOUR STAR IGNITION-DRY

367,951
SUPERBLEND

368,127
Lilac IMPERIAL

370,018
LOYAL

370,310
FOUGÈRE

370,312
Lewisite Cleanser

371,287
SOYALASTIC

371,297
Del Monte

371,345
FURN-I-POL

371,384
ETERNA

371,429
FLOROTONE

371,626
EKC

371,644
FROST-EX

371,802
NO-ODOROL

371,869
Zephiran

371,879
ALBATAN

371,990
CARBORITE

371,992

Trade Mark Descriptions†

350,634. Janvy, Inc., Brooklyn; filed Apr. 28, '34; for cleaner and powdered soaps; use since Apr. 4, '34.

359,967. Societe Des Usines Chimiques Rhone-Poulenc, Paris, France; filed Jan. 5, '35; for cellulose acetate sheets; use since July 12, '34.

360,220. Farbudd Mfg. Co., Long Island City, N. Y.; filed Jan. 14, '35; for liquid shoe cleaner; use since Apr. '34.

364,533. Ace Hardware Corp. (Ace Stores), Chicago; filed May 4, '35; for metallic paints, paint materials, waxes, etc.; use since Mar. 1, '28.

365,451. Four Star Lab., Chicago; filed May 27, '35; for coating liquids used to protect ignition wires, spark plugs, and distributor caps and coils; use since Sept. '28.

367,951. Vegetable Oil Products Co., Los Angeles; filed Aug. 2, '35; for paint oil; use since June, 19, '35.

368,127. Colgate-Palmolive-Peet, Jersey City; filed Aug. 9, '35; for toilet soap; use since Jan. 31, '10.

370,018. Royal Soap & Chemical, Los Angeles; filed Oct. 4, '35; for household cleansers, mechanic's paste soap, and metal and glass polish; use since July 16, '31.

370,310. Houbigant, Inc., N. Y. City; filed Oct. 12, '35; for soaps, shaving creams; use since 1899.

370,312. Harry R. Lewis & Co., Providence, R. I.; filed Oct. 12, '35; for cleansing preparations; use since May 6, '35.

371,287. Glidden Co., Cleveland; filed Nov. 8, '35; for ready mixed paints and paint enamels; use since Oct. 15, '35.

371,297. California Packing Corp., San Francisco; filed Nov. 7, '35; for fish oil; use since Oct. 17, '35.

371,345. Glidden Co., Cleveland; filed Nov. 8, '35; for furniture polish with cleaning properties; use since Oct. 24, '35.

371,384. Devoe & Raynolds, N. Y. City; filed Nov. 9, '35; for ready mixed artists' oil colors; use since Aug. 16, '35.

371,429. Procter & Gamble, Cincinnati; filed Dec. 9, '35; for soap; use since Sept. 20, '35.

371,626. Eastman Kodak; filed Nov. 16, '35; for lacquer-like leather dressing; use since '16.

371,644. Leef Bros., Minneapolis; filed Nov. 16, '35; for chemically treated textile pad used to remove frost, ice, etc., from auto windows; use since Sept. 1, '34.

371,802. American Cyanamid & Chemical; filed Nov. 21, '35; for sulfonated oils used in dyeing and finishing of textiles; use since Nov. '33.

371,869. I. G., Frankfort-am-Main, Germany; filed Nov. 22, '35; for antiseptic and disinfectant; use since Aug. 1, '35.

371,879. Martin Dennis Co., Newark, N. J.; filed Nov. 22, '35; for tannage for white leather; use since June '04.

371,990. U. S. Graphite Co., Saginaw, Mich.; filed Nov. 25, '35; for natural amorphous graphite; use since Nov. 7, '35.

371,992. Niagara Sprayer & Chemical, Middleport, N. Y.; filed Nov. 25, '35; for parasiticides; use since May 1, '13.

Chemical Specialty Patents*

Production film-forming electrolytic paste of high viscosity made up as follows: 36% by weight glycerine; 56 parts ammonium borate; 7 parts potato starch; and 1 part agar-agar. No. 2,028,775. Paul Hetenyl, N. Y. City, to Solar Mfg. Corp., a corp. of N. Y.

Sound record material consisting of a phenol condensation product which contains soft, water soluble soap. No. 2,028,854. Samuel Whyte, Redhill, Surrey, England, to Electric & Musical Industries Ltd., Middlesex, England.

Adhesive material comprising about 55% volatile solvent, 30% rubber cement, 5% latex, and 5% heavy drying-retardant mineral oil. No. 2,029,008. Ralph A. Wilson, Chicago; one-half to George A. Chritton.

Production of transfer ink consisting of 5 parts shellac, one part titanium dioxide, one-half part tricresyl phosphate, 5 parts rosin, and one-half part varnish. No. 2,029,204. Frank Solomon, N. Y. City, to Beatrice Brier, Long Beach, N. Y.

Production of roofing felt by cooking jute fibers. No. 2,029,310. Pierre Drewsen, Sandusky, Ohio, to The Barrett Co., a corp. of N. J.

Process of stabilizing soap products by addition of para-tertiary-amyl phenol. No. 2,029,506. Robert M. Reed to The Procter & Gamble Co., both of Cincinnati, Ohio.

Production of photographic emulsions of silver halide gelatine which includes a ripening process for the emulsions. No. 2,029,946. Max Schmid, Riehen, near Basel, Switzerland, to Society of Chemical Industry in Basle, Basel, Switzerland.

Use of palmetto wood for improving growth of plants, trees, shrubs, etc. No. 2,029,988. William B. Doe, deceased, late of Jacksonville, Fla.; Flora N. Doe, administratrix for deceased, to The Hydro-Humus Corp. of America, Jacksonville, Fla.

Production and application of finish remover. No. 2,029,992. Carleton Ellis, Montclair, N. J., to Chadeloid Chemical Co., N. Y. City.

Non-slippery polishing wax for floors or woodwork containing small amount of rubber to impart increased coefficient of friction to the waxed surface. No. 2,030,055. Tod G. Dixon, Brooklyn, N. Y.

Glue preparation made by mixing dry raw cassava starch with dry copper sulfate, water, and caustic. No. 2,030,073. Gordon G. Pierson, Lansdale, Pa., to Perkins Glue Co., a corp. of Del.

Production fertilizer mulch paper comprising, in combination, paper ribbon coated on one side with a prepared fertilizer, ribbon having partially pierced discs spaced along its length. No. 2,030,267. Edward Roy Pratt, West Medford, Mass.

Composition used to cover stains permanently, and made up as follows: mixture of pontianak gum, resin, denatured alcohol, celluloid scraps, methyl acetone, benzol, castor oil, and ultramarine blue. No. 2,030,294. Leo L. Hazel, Portland, Ore.

Photographic developer comprising developing agent and a weak acid salt of a hydroxy-alkyl-amine. No. 2,030,336. Heinrich Ulrich and Karl Saurwein, Ludwigshafen-am-Rhine, Germany, to Agfa Ansco Corp., Binghamton, N. Y.

Production of emulsions by melting a wax, adding to melt a water soluble salt, and adding then a 2nd water soluble salt which will form a gel with the first salt. No. 2,030,385. George James Manson, Hawkesbury, Ontario, Canada, to Manson Chemical Co., Montclair, N. J.

Treatment of clear glass flakes for use on mirrors comprising treatment with fresh, dilute stannous chloride solution, and plating with solution of silver nitrate and dextrose. No. 2,030,476. Harry Edward Smith to Foster Dee Snell, both of Brooklyn, N. Y.

Dilute paste insecticide emulsion containing water, an oil, finely powdered derris or cube root, a natural gum as emulsifier, resins, saponin, and colloidal clay. No. 2,030,584. Clyde C. Hamilton, Highland Park, N. J.

Method of coating iron or steel with rust-proofing composition comprising an aqueous solution of phosphoric acid and chromate with sodium bichromate. No. 2,030,601. Guy A. MacDonald, Chicago Heights, Ill., to Victor Chemical Works.

Specialty patents continued on next page.

* Patents covered in this issue include those appearing in the *U. S. Patent Gazettes*, Jan. 28 to Feb. 18.

† Trade-marks reproduced and described cover those appearing in the *U. S. Patent Gazettes*, Jan. 28 to Feb. 18.

Specialty Patents (Continued)

Adhesive containing water and a water-insoluble, unsaponifiable, readily volatile organic liquid emulsified with the aqueous adhesive and being non-reactive with the adhesive. No. 2,030,633. Harry E. Holcomb, Stratford, Conn., to Johns-Manville Corp., N. Y. City.

Waterproof binder for sandpaper comprising 40 parts solution of a cellulosic compound, 3 parts resin, 1 part gum camphor, and 2 parts oil. No. 2,030,743. Richard P. Carlton to Minnesota Mining & Mfg. Co., both of St. Paul, Minn.

Process making thin wood sheets permanently soft and flexible by treatment with alkali and saturation with water-soluble substances such as glycerol. No. 2,030,819. Reginald Oliver Herzog, Berlin-Steglitz, and Alfred Burgeni, Berlin-Lichterfelde-West, Germany, to Wallwood Corp., N. Y. City.

Textile assistants comprising mixture of Turkey red oil, spent sulfite liquor, an alkali metal phosphate, an alkali metal salt of an alkylated naphthalene sulfonic acid, and a dissolving medium. No. 2,030,859. Othmar Drapal, Cologne-Mulheim, Germany, to General Aniline Works, Inc., N. Y. City.

Production light-sensitive, print-out emulsions by precipitating silver hydroxide in aqueous solution, dissolving in organic alkali, mixing solution with inert carrier, and adding an alkali metal halide. No. 2,030,860. George Earle Fallesen and Cyril J. Staud to Eastman Kodak Co., all of Rochester, N. Y.

Striking composition for match boxes consisting of 85-95% by weight rosin, 1-3% shellac, 1-2% paraffin and wax, 3-10% resinous material, and a ground abrasive material. No. 2,030,892. Michail G. Pelipetz; one-half to Peter L. Doodchenko, both of N. Y. City.

Formation of sensitized mono-pack photographic film made by coating carrier with solution of color sensitizing dyes and filter dyes, and using second coating of emulsion. No. 2,030,903. Hans von Fraunhofer to Omnichrome Corp., both of N. Y. City.

Treatment of mono-pack photographic film by diffusing into the film emulsion sensitizing dyes and filter dyes. No. 2,030,904. Hans von Fraunhofer to Omnichrome Corp., both of N. Y. City.

Refrigerant mixture for absorption type apparatus consisting of normally liquid dichlor benzol as solvent and methyl chloride as refrigerant. No. 2,031,087. Glenn F. Zellhoefer, Bloomington, Ill.

Non-flammable dry cleaning solvent comprising mixture of 35 to 40 parts by volume petroleum naphtha with 65 to 60 parts carbon tetrachloride. No. 2,031,144. Merrill A. Youtz, Hammond, Ind., to Standard Oil Co. (Indiana), Chicago.

Non-flammable dry cleaning solvent comprising mixture of petroleum naphtha with acetylene tetrachloride. No. 2,031,145. Merrill A. Youtz, Green Bay, Wis., to Standard Oil Co., Chicago.

Production sand-paper and other abrasive sheets made waterproof by wax deposited from emulsion in the paper stock, paper carrying abrasive grit as coating bound to the surface with a nitrocellulose composition. No. 2,031,-362. Carleton Ellis, Montclair, N. J., to Ellis-Foster Co., a corp. of N. J.

Castor machine oil comprising a mineral oil, 0.1-5.0% mono lower alkyl ether of glycol, and 1.0-5% aluminum soap of either stearic, palmitic or behenic acid. No. 2,031,405. Arthur L. Blount, Palos Verdes Estates, Cal., to Union Oil Co. of Cal., Los Angeles.

Automotive Accessories Exhibit

Automotive accessories producers held an exhibit at Hotel Edison, N. Y. City, late last month. Of the 439 exhibitors whose exhibits covered 6 floors of the hotel, about 50 showed the latest in auto polishes, radiator cleaners, spot removers for upholstery, etc. Chemical specialties exhibitors at the show included J. A. Tumbler Laboratories, Merck & Co., whose new specialties line has just been announced, Auto Specialties Mfg., Bemis Bag, Glidden, S. C. Johnson & Son, Simoniz, Technical Chemical, and Richman Chemical. Other exhibits showed accessories ranging from hub caps and rubberized seat covers to the latest in auto radios.

371,993 SUSPENSO

372,007 BUGERINE SURE DEATH TO INSECTS

372,039 MOSQUITOZOFF

372,052 SETAMOL

372,061 CLAROFIN

372,072

372,104 Elkay

372,090 DRUMS DRUMS

372,109 Gayla

372,112 SEALPRIME

372,124 Lucas a Great Name in PAINTS

372,144 CHOLOPROL

372,145 MAPROMIN

372,300 MUROCAL

372,397 KANTRUNIZE

372,146 MAPROMOL

372,256 TRI-OGEN

372,491 VISTANEX

372,515 "IT PETRIFIES" Petra Stone

372,550 VIX-ENE

373,052 CLEAROLIN

372,948 APEX

Descriptions

371,993. Niagara Sprayer & Chemical, Middleport, N. Y.; filed Nov. 25, '35; for parasiticides; use since Oct. 30, '35.

372,007. Lena Ergang (Cahn Mfg. Co.), Philadelphia; filed Nov. 26, '35; for liquid insecticide; use since July 5, '35.

372,039. Bohlender Plant Chemicals, Tippecanoe City, Ohio; filed Nov. 27, '35; for insect-repelling liquid; use since Mar. 5, '35.

372,052. General Dyestuff Corp., N. Y. City; filed Nov. 27, '35; for addition agents in wool and silk dyeing; use since Oct. 25, '28.

372,061. Mathieson Alkali; filed Nov. 27, '35; for chemical product used in bleaching oils, fats and fatty acids; use since Oct. 4, '35.

372,072. Standard Ultramarine, Huntington, W. Va.; filed Nov. 26, '35; for dyestuffs and aniline dyes; use since '14.

372,104. L. Klein, Inc., Chicago; filed Nov. 29, '35; for gloss starch; use since Jan. 12, '24.

372,090. Drums, Inc., Detroit; filed Nov. 29, '35; for dry cleaning powder; use since June 1, '35.

372,109.* Lever Bros., Cambridge, Mass.; filed Nov. 29, '35; for detergent compound; use since Nov. 23, '35.

372,112.* Patterson-Sargent Co., Cleveland; filed Nov. 29, '35; for dry, ready-mixed paints, paint enamels, stains, lacquers, and varnishes; use since July 26, '34.

372,124. John Lucas & Co., Philadelphia; filed Nov. 26, '35; for paints, varnishes, calsomines, etc.; use since June 1, '34.

372,144. Richards Chemical Works, Jersey City; filed Nov. 30, '35; for softening, finishing, or lubricating agent in textile work; use since Aug. '33.

372,145. Richards Chemical Works; filed Nov. 30, '35; for dispersive agent in textile work; use since Apr. '33.

372,300.* Muralo Co., New Brighton, N. Y.; filed Dec. 5, '35; for dry powder to be mixed with water for use as calcimine; use since May 1, '35.

372,397. Nathan N. Davidson, Des Moines, Iowa; filed Dec. 9, '35; for chemical preventing runs in silk hosiery; use since Nov. 1, '35.

372,146. Richards Chemical Works; filed Nov. 30, '35; for softening, or emulsive and wetting out agent; use since Apr. '33.

372,256. Edwin M. Rosenbluth (Rose Mfg. Co.), Philadelphia; filed Dec. 4, '35; for fruit fungicides, insecticides, etc.; use since July 11, '32.

372,491. Standard Oil Development Co., Linden, N. J.; filed Dec. 10, '35; for waterless industrial and household cleaner; use since July 19, '35.

372,515. Hewit-Gates Co., Corpus Christi, Tex.; filed Dec. 11, '35; for paints used on concrete, stucco, brick, or stone; use since Aug. '34.

372,550. Everett & Barron Co., Providence, R. I.; filed Dec. 12, '35; for waterproofing dressing for leather articles; use since Nov. 30, '35.

373,052. Sherwin-Williams; filed Dec. 24, '35; for paints, varnishes, paint materials, etc.; use since Nov. 26, '34.

372,948. Atlas Powder; filed Dec. 23, '35; for exploisve powder and dynamite; use since June 1, '35.

* *From Jan. 21 "Patent Gazette."*

360,258

369,798

L-R

370,235

Varno

371,129

ARAFLEX

371,474

"NEW-VO"

371,686

42nd Street

370,238

COSCO

371,501

PUREX

372,179

DIHEXYLIN

372,239

LDA-4

372,243

MAZIC

372,320

FELS-NAPTHA SOAP CHIPS

THE GOLDEN CHIPS WITH THE CLEAN NAPTHA ODOR

372,372

KALAX

372,428

DOG-TEX

372,430

INSULAG

372,431

INSULINE

372,449

ALBA

372,594

POLARITE

372,595

RECOTO

372,602

JEWEL DOUBLEQUICK

372,757

Monarch

372,766

FURASOL

Descriptions

360,258. U. S. Gypsum, Chicago; filed Jan. 14, '35; for asphalt roofing, and other building materials; use since '18.
369,798. Logan-Robinson Fertilizer Co., Charleston, S. C.; filed Sept. 24, '35; for complete fertilizers and fertilizer materials; use since Dec. 1, '23.
370,235. Albert R. Morrison, Pueblo, Colo.; filed Oct. 7, '35; for furniture and automobile polish; use since Sept. 15, '09.
371,129. Arabol Mfg. Co., N. Y. City; filed Nov. 4, '35; for glue; use since May 9, '27.
371,474. A. C. Ransom Corp., N. Y. City; filed Nov. 12, '35; for printing and lithographing inks; use since July '35.
371,686. 42nd Street Sales Co., Chicago; filed Nov. 18, '35; for soaps, etc.; use since June 6, '35.
370,238. General Office Supply, Newark, N. J.; filed Oct. 9, '35; for carbon paper and typewriter ribbons; use since Apr. 1, '26.
371,501. Purex Corp. Ltd., Los Angeles; filed Nov. 13, '35; for drain opener; use since May '33.
372,179. Parke, Davis & Co., Detroit; filed Dec. 2, '35; for antiseptic and germicide; use since Nov. 2, '35.
372,239. Dewey & Almy Chemical, Cambridge, Mass.; filed Dec. 4, '35; for dispersing agents; use since Nov. 20, '35.
372,243. Hanson-Van Winkle-Munning, Matawan, N. J.; filed Dec. 4, '35; for electroplating bath ingredients; use since Nov. 8, '35.
372,320. Fels & Co., Philadelphia; filed Dec. 6, '35; for soap; use since July 11, '35.
372,372. James J. Lax, N. Y. City; filed Dec. 7, '35; for household and industrial cleansers and soap powders; use since Nov. 20, '34.
372,428. Seymour Paull (Consolidated Chemical Works), Chicago; filed Dec. 9, '35; for deodorant and stain remover; use since Oct. 22, '35.
372,430. Quigley Co., N. Y. City; filed Dec. 9, '35; for refractory cement; use since Nov. 12, '35.
372,431. Quigley Co.; filed Dec. 9, '35; for refractory cement; use since Nov. 21, '35.
372,449. The M. Werk Co., St. Bernard, Ohio; filed Dec. 9, '35; for stearic acid; use since Feb. 26, '19.
372,594. Faust-Booth Paint Co., St. Louis, Mo.; filed Dec. 13, '35; for ready-mixed paints and paint enamels; use since May 20, '35.
372,595. Faust-Booth Paint Co.; filed Dec. 13, '35; for ready-mixed paints and paint enamels; use since May 20, '35.
372,602. Jewel Paint & Varnish Co., Chicago; filed Dec. 13, '35; for paint and/or varnish remover; use since Nov. 29, '35.
372,757. American Gypsum Co., Port Clinton, Ohio; filed Dec. 18, '35; for insecticides; use since Nov. 30, '35.
372,766. General Dyestuff, N. Y. City; filed Dec. 18, '35; for fur dyes; use since Dec. 3, '35.

R. F. Carr, Dearborn Chemical president, is elected a trustee of Northwestern Mutual Life.

Wilbur White Chemical Sold

Wilbur White Chemical, an Innis, Speiden subsidiary manufacturing wax emulsions at Owego, N. Y., is sold to Franklin Research of Philadelphia, and will be known as the Wilbur White Chemical Co. Division, with W. A. Bridgeman, former president, in charge.

Jetal Process Sales & Service

The Jetal process for coloring all grades of iron and steel a uniform, brilliant jet black, developed by Alrose Chemical, is now sold and serviced exclusively by Hanson-Van Winkle-Munning, Matawan, N. J.

Valuable to Oil Buyers

John B. Gorden, secretary of the Bureau of Raw Materials for American Vegetable Oils and Fats Industries, Washington, spoke recently on "Philippine Independence and America's Foreign Trade in the Orient" before the Cincinnati Chamber of Commecre. A limited number of copies of his address are available to interested persons by writing the Association at the National Press Bldg., Washington.

Employee Bonuses Reported

E. F. Houghton & Co., Philadelphia producer of industrial oils, gave 325 employees a 50% larger service bonus last month. P. & G. workers received $600,000 and promise of a week's vacation with pay.

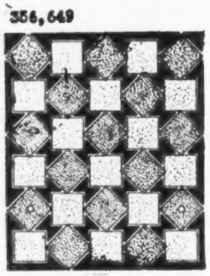
Rubbing Alcohol Adulteration

Rubbing alcohol adulteration is growing, Federal drug officials report, with isopropyl alcohol being used instead of ethyl alcohol.

BRINGING SMILE TO SPRING CHORES

Oakite opens Spring cleaning drive. First in series of newspaper "ads" to appear in the Metropolitan N. Y. Section (See page 287 also).

356,649



368,264

SERVICE QUALITY MERCO

372,257

RUFFERSEAL

372,616

GLYSORBINE

371,387

PENNANT

372,646

MULTIFEX

359,619

FLASHGARD

359,620

WORMGARD

371,660

MONOPOLE

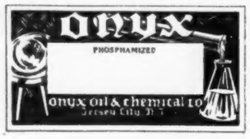
372,853

PETROSOTE

368,720

VEL-VET-TEEN

371,737



372,892

Microsulfur

368,916

PEP-TO-LIZER

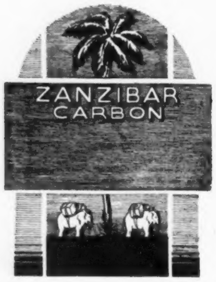
373,127

CARBOSEAL

369,857

Pylumin

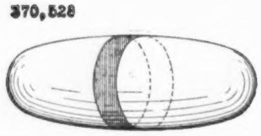
371,814



373,133

RODOPELL

370,528



373,221

ANGELUSTRE

Descriptions

356,649. Uncle Sam Chemical Co., N. Y. City; filed Oct. 1, '34; for floor wax; use since Feb. '32.

359,619. T. L. Cunningham, N. Y. City; filed Dec. 24, '34; for liquid preventing accidental ignition of ignitable materials; use since Dec. 3, '34.

359,620. T. L. Cunningham; filed Dec. 24, '34; for liquid insecticide; use since Dec. 3, '34.

368,720. Vel-Vet-Teen Co., Springfield, Mass.; filed Aug. 26, '35; for hand cleanser in paste form; use since July 1, '35.

368,916. Archie C. Bingham (The Bingham Poultry Ranch), South Edmeston, N. Y.; filed Sept. 3, '35; for fertilizers; use since July 1, '34.

369,857. Pyrene Mfg. Co., Newark, N. J.; filed Sept. 30, '35; for protective and priming coatings on aluminum or aluminum alloys; use since July 22, '35.

370,528. Robert P. Scherer (Gelatin Products Co.), Detroit; filed Oct. 18, '35; for carbon disulfide in capsule form; use since Aug. '35.

368,264. Merchants Chemical Co., N. Y. City; filed Aug. 13, '35; for laundry chemicals; use since dates ranging from Nov. '29 to July '35 on various products.

371,387. Globe Roofing Products Co., Chicago; filed Nov. 9, '35; for asphalt composition roofing and building papers; use since Apr. '34.

371,660. Jacques Wolf & Co., Passaic, N. J.; filed Nov. 16, '35; for oil used in textile treatment; use since July 2, '07.

371,737. Onyx Oil & Chemical Co., Jersey City; filed Nov. 19, '35; for sulfonated oils, fats, waxes and alcohols used in treatment of fabrics; use since Nov. 12, '35.

371,814. B. Heller & Co., Chicago; filed Nov. 21, '35; for concentrated liquid laundry blue; use since July 19, '35.

372,257. Louis D. Stern (Monroe Co.), Cleveland; filed Dec. 4, '35; for liquid asbestos roof cement; use since July 14, '22.

372,616. Warwick Chemical Co., West Warwick, R. I.; filed Dec. 13, '35; for organic salt used in silk throwing; use since Dec. 6, '35.

372,646. R. T. Vanderbilt Co., N. Y. City; filed Dec. 14, '35; for processed calcium carbonate; use since Dec. 2, '35.

372,853. Penola, Inc., Pittsburgh; filed Dec. 19, '35; for wood preservatives, insecticide and disinfectant bases, animal dips and industrial dilutents; use since Mar. 6, '35.

372,892. Portland Gas & Coke Co., Portland, Ore.; filed Dec. 20, '35; for precipitated sulfur; use since Oct. 25, '35.

373,127. Carbide & Carbon Chemicals; filed Dec. 28, '35; for chemical gas sealers; use since Dec. 18, '35.

373,133. Gustavus J. Esselen, Inc., Boston; filed Dec. 28, '35; for vermin repellant; use since Sept. 4, '34.

373,221. Louangel Corp., N. Y. City; filed Dec. 31, '35; for shoe polish; use since Dec. 21, '35.

Monroe Chemical Earnings

Monroe Chemical, packaged dyes, showed a net decline in profits in '35 from '34 total-88c a share against $1.27.

German Soap Sales Decline

After attaining a record peak in '30 German soap exports have declined rapidly, particularly during '35 and the 2 preceding years. Germany's exports of common soft and liquid soaps, sold in bulk containers, however, have been well maintained in recent years, and hard grained laundry soap shipments have advanced steadily.

Why Carnauba is Higher

Brazilian production of carnauba wax, a vegetable raw material used extensively in the manufacture of shoe, furniture and automobile polishes, as well as for many other purposes, is officially estimated to have been in the neighborhood of 10,000 metric tons last year, an increase of 488 tons over '34, according to a report from Assistant Trade Commissioner A. A. Barrington, Rio de Janeiro, made public by the Commerce Dept.'s Chemical Division.

Brazilian production, which averaged around 6,450 tons per annum between '25 and '29, has increased steadily in recent years, though the output is somewhat irregular and depends to a large extent upon world prices and the availability of labor for gathering the crop. In many Brazilian localities wax is gathered from the carnauba palm as a side line of farming, report states.

Increasing inaccessibility of the palms and the resulting difficulty and hardship in securing the wax has resulted in a decrease of available stocks in Brazil and contributed to the recent marked increase in world prices.

Exports of carnauba wax from Brazil, which is the only country that produces this material to any extent commercially, amounted to 5,789 metric tons during the 1st 11 months of '35 compared with 6,146 tons for the whole of the preceding year, Brazilian statistics show.

The U. S., with its large polish manufacturing industry, is Brazil's largest customer for carnauba wax, normally taking more than one-half of the total shipped to foreign countries.

New Specialty Firms

General Chemical Heater, Inc., Huntington, W. Va., capitalized at $25,000. To manufacture and sell chemical heaters. Incorporators: R. C. Clark, of Canton, O.; P. M. Elliot, of Charleston, and W. W. Smith, of Huntington.

Snow White Co., Salisbury, N. C. To manufacture and sell every and all types of cleaning compounds. Authorized capital stock $100,000, subscribed stock $4,000, by A. S. Mowery, C. A. Troutman, M. B. Burt and Charles Parker, all of Salisbury.

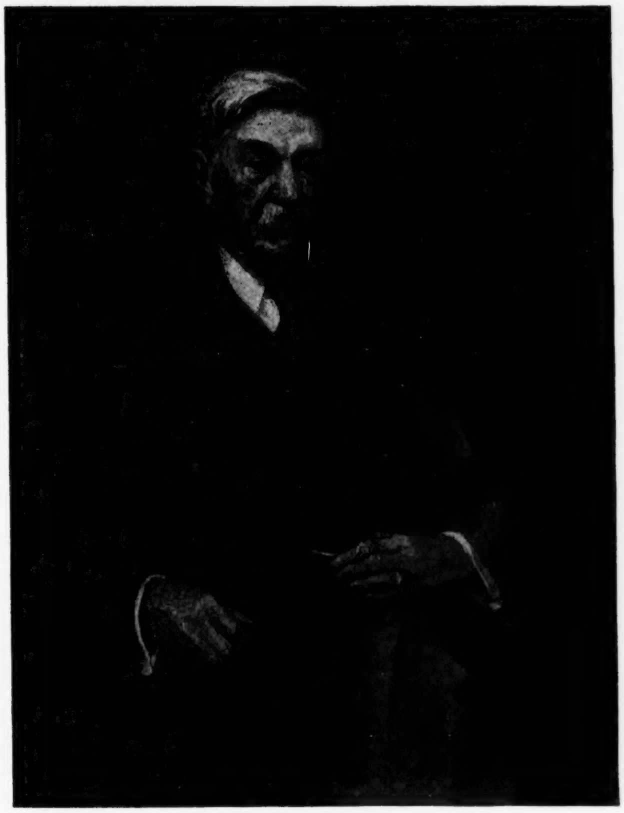
Agricultural Insecticide, Inc., Belle Glade, Fla., to deal in insecticides. Incorporators: G. E. Turner, L. H. Nash and W. W. Stone.

Volcocite Corporation. Deal in soap, soap products, cleaning compounds. 250 shares, no par value. J. Vernon Pimm, Albert G. Bauer, Philadelphia, Pa.; R. L. Spurgeon, Wilmington, Del. (Corporation Guarantee & Trust Co.)

Klorosol, Ltd. Deal in antiseptics. 250 shares, no par value. M. M. Lucey, H. I. Martin, L. S. Dorsey, Wilmington, Del. (Colonial Charter Co.)

CHEMICAL

NEWS & MARKETS



Morris R. Poucher
1859-1936

Calco

INTERMEDIATES

ANILINE OIL
ANILINE SALT
NITROBENZENE
OIL OF MYRBANE
BETA NAPHTHOL
DIMETHYLANILINE
DINITROBENZENE
ANTHRAQUINONE

DINITROTOLUENES
TOLUIDINES
NITROTOLUENES
PARANITRANILINE
PARAPHENYLENEDIAMINE
PICRAMATE OF SODA
SULPHANILIC ACID
METATOLUENEDIAMINE

CALCO

THE CALCO CHEMICAL CO., INC.
BOUND BROOK, NEW JERSEY : *Dyestuffs—Intermediates—Chemicals*
34 Hartford St., Boston - 90 West St., New York - 2 South St., Philadelphia - 146 W. Kinzie St., Chicago - 1112 S. Boulevard, Charlotte - 40 Fountain St., Providence
A DIVISION OF AMERICAN CYANAMID COMPANY

MONSANTO ENDS SUBSIDIARIES

Merrimac Name Retained—Buys Thomas & Hochwalt "Labs" —March, Thorpe Dinner Speakers—"Chem Engineers" to Meet in London—NRA Wage Scales Maintained—

Monsanto, to simplify its capital structure, is proceeding to liquidate several of its wholly owned subsidiaries. Merrimac Chemical, however, will not be liquidated and will continue to operate as heretofore. Among the more important subsidiaries being liquidated are Rubber Service Laboratories; Virginia Fertilizer, and Wilckes, Martin, Wilckes. Henceforth, all of the operations of the latter named companies will be carried on under the name of Monsanto Chemical Co.

Edward M. Queeny, Monsanto president, announced Mar. 2nd that contracts have been made providing for acquisition of Thomas & Hochwalt Laboratories of Dayton, and its subsidiary, the Dayton Synthetic Chemicals, Inc.

Monsanto thus acquires the only outstanding minority interest in its controlled subsidiary, Monsanto Petroleum Chemicals, Inc., through an exchange of 14,000 shares of Monsanto common. Latter company, which is in the research and development stage, has carried on its work in the laboratories of Thomas & Hochwalt.

Mr. Queeny stated that this acquisition augments the Monsanto research department with a highly trained staff with varied experience. Laboratories will be known as the Thomas & Hochwalt Laboratories Division of Monsanto Chemical Co. and will continue under the direction of Dr. Charles A. Thomas and Dr. Carroll A. Hochwalt. Arrangements have been made for gradual discontinuance of the research Thomas & Hochwalt Laboratories have been conducting for other companies and for the transfer of their sole attention to the problems of Monsanto.

Industry Dinner, Mar. 19th

Col. Charles H. March, chairman of the Federal Trade Commission, and Merle Thorpe, editor of *Nation's Business*, will be the principal speakers at the 11th Annual Dinner of the Drug, Chemical and Allied Trades Section of the N. Y. Board of Trade, to be held at the Waldorf on Mar. 19th.

Speaking on this subject Lee Bristol, chairman of the speakers' committee, said, "In making this announcement the committee feels confident that it is offering a program worthy of considerable attention during the times through which we are passing. The F. T. C., due to legislation now being considered in Washington, is being brought into a position unprecedented in its history. Naturally, no one is in a better position to discuss this than its chairman, Colonel Charles H. March, and those attending the Annual Banquet on Mar. 19th can be assured of a message of outstanding importance.

"Mr. Thorpe is well known in his capacity of publisher and commentator on current events. He is an interesting speaker and well versed in the problems confronting the nation today."

Attendance at the dinner this year will be restricted to 1,200. For this reason it is advisable to make reservations at once with Ray Schlotterer, secretary of the section, 41 Park Row. Tickets are $7.50 apiece and tables will accommodate 10.

U. S. to Present 16 Papers

The Chemical Engineering Congress of the World Power Conference, to be held at the Central Hall, Westminster, England, June 22-27, will be participated in by representatives of 13 countries; 116 papers will be delivered, technicians of the U. S. presenting 16. The congress will be divided into 12 sections: ferrous metals, refractories, rubber, plastics and other materials in plant construction; separation; size reduction, grading and mixing, electrolysis and electrical applications; destructive distillation; treatment and disposal of effluents and waste materials; lubrication; high pressure reactions and high vacua; heat exchange; education and training, statistics, administration, safety and welfare; trend of development; and general aspects. The American Institute of Chemical Engineers is making elaborate plans for active cooperation in the congress, and a large number of the prominent chemical engineers in this country have already signified their intention of attending.

The Chemical Engineering Congress will be international in character, but the chemical plant exhibition to be held simultaneously on other floors of the same building by the British Chemical Plant Manufacturers' Association will be confined to British equipment.

Wages & Hours of Labor Studied

NRA wage scales and hours of labor were maintained by 58% of the chemical firms selling products to the Government, a recent survey compiled by the Government Contracts Division of NRA, shows. Division is now included in the Dept. of Labor.

Figures for the chemical and allied products industry showed that 134 establishments, with 39,646 employees, maintained both wage and hour provisions; while 40 firms, employing 6,003 persons, conformed in neither. Twenty-seven firms, employing 5,848 persons, conformed to wage provisions but not hours; seven, with 2,190 employees, maintained maximum hours but not minimum wages. In the case of 4 firms, with 305 employees, wages went up while hours remained the same, one firm, employing 20, reduced hours but not wages; and one establishment, employing 35, raised both wages and hours.

Largest classification within the chemical and related products group is for chemical plants, and shows that there were 68 contracting firms with 24,175 employees. Of these, 41 firms, employing 19,126, conformed to NRA provisions as to both wages and hours, and 18 plants, employing 4,732 persons, conformed to wage regulations but not hours. Two firms, with 282 employees, raised wages while hours remained the same, and one, with 35 employees raised both wages and hours.

Industry Loses 3 Great Leaders Last Month

Rosengarten, Outstanding Fine Chemical Technologist, Zabriskie, Borax Pioneer, and Poucher "Father of American Dye Industry," Pass On—North Killed in Laboratory—Other Industry Deaths—

Dr. George David Rosengarten, 67, nationally known figure in science and industry, vice-president of Powers-Weightman, Rosengarten for years prior to the merger with Merck in '27, died on Feb. 24th after an illness of several months. Dr. Rosengarten received his B.S. from the University of Pennsylvania in 1890 and his Ph.D from the University of Jena, Germany, 2 years later. He was a very active member of the A. C. S., having been a director since 1919, a member of the executive committee for a long period and serving as president in '26. He was also a past president of the A. I. Ch.E. and a fellow of the American Association for the Advancement of Science. He was a member of the Committee of Revision of the U. S. Pharmacopeia, of the American Philosophical Society and of the Franklin Institute. He was a director of the Philadelphia National Bank.

Dr. Rosengarten was one of the country's outstanding chemists, and much of the advancement in technique employed in fine chemicals and medicinal manufacture in the 1st quarter of this century was developed by him. His death recalls to

many in those fields the history of the 3 fine chemical manufacturing firms which finally resulted in the present Merck organization.

The Rosengarten country home, "Hilldene," is located at Malvern, near Philadelphia, and is one of the show places of the East.

In addition to his widow, Dr. Rosengarten is survived by 3 brothers, Adolph G. Rosengarten, Frederic Rosengarten and Joseph G. Rosengarten, and 2 sisters, Mrs. W. W. Atterbury, widow of a former president of the Pennsylvania Railroad, and Mrs. Lewis Neilson.

Made "20 Mule Team" Famous

"I am one of the mules." Often was this the retort of Christian Brevoort Zabriskie, retired Pacific Coast Borax president, who died Feb. 7th, to the query, "Are you connected with that firm that has that mule team?" A native of Fort Bridger, Wyo., he was the son of Col.

CHRISTIAN BREVOORT ZABRISKIE

Elias B. and Justine Jackson Zabriskie. He was the 1st white child born in Wyoming Territory, or at least his birth is the 1st one to have been recorded. His grandfather was a doctor in N. Y. City who left a good practice to join the California Gold Rush in 1849. Accompanied by a son they made the journey around the "Horn." Mr. Zabriskie's father entered the army during the Civil War from California and remained in the regular army after hostilities ended.

Young Zabriskie was working in the Nevada silver fields as a telegraph operator when in 1885 the famous character "Borax" Smith gave him a job in Columbus Marsh working out borax. At one period he ran a store with George Albright, father of Horace Albright, vice-president of U. S. Potash. But the romance of winning borax against the tremendous odds of Death Valley fascinated him and drove him on to fame. After a period in the Valley he came on to N. Y. City as a salesman and soon became famous for his wealth of stories as well as his ability to sell borax.

He was a fighter who neither asked nor gave much quarter. He drove himself to the very top of the borax industry despite tremendous odds, and the complete story of his life is one that is intimately bound to the history of the development of the Far West.

Mr. Zabriskie was also at one time treasurer of the U. S. Borax Co., president of the National Sulphur Co., vice-president of the Tonopah & Tidewater Railroad Co. and the Death Valley Railroad Co. During the World War period he served on several war loan committees.

Mr. Zabriskie belonged to the Holland Society, Loyal Legion and the Society of Chemical Industry. Among his clubs were the Union League, National Arts and the Bohemian of San Francisco. His collection of silverware and relics of the Far West, which he had carefully indexed at his estate "Belle Terre," Port Jefferson, L. I., was one of the finest of its kind in the country.

Ended Dye Monopoly

Morris R. Poucher, 76, retired du Pont official, who played a prominent part in the development of an American dye industry during and after the World War and whose intensive work aided materially in the construction of a dye plant at Deepwater, N. J., by the du Ponts, died suddenly on Feb. 11. Mr. Poucher, who was president of the National Fuels Corp., had just returned from luncheon when he was stricken with a heart attack.

Morris Poucher was connected for years with the American branch of Badische. Upon the sinking of the "Lusitania" he resigned the following day at a dramatic meeting with his associates and from then on devoted his boundless energy and intimate knowledge of the intricate German dye business to the building of an American dyestuff industry to rid the country of dependence upon foreign supplies. He joined the du Pont Co. in '16, struggled with the erection and operation of the first dye plant at Deepwater, and later became sales manager of dyes. The war over, he, in association with Francis P. Garvan, then Alien Property Custodian, and Dr. Charles Herty, led a united movement of American dyes manufacturers for legislation which would permit the building up of the industry on a firm basis. After a "life and death" struggle, waged in and out of Congress, a clear-cut victory was won.

Mr. Poucher was one of the founders of the "Synthetic Organic" Association. In 1934, in recognition of his public service, he, with Mr. Garvan and Dr. Herty, was tendered a testimonial dinner by the Association and Mr. Poucher was made an honorary member. He retired in 1923 from the du Pont organization, but he could not remain long out of harness and so he became connected with National Fuels Corp. in which Cyanamid is now taking an active interest. He resided in Scarsdale, N. Y., and is survived by his widow, 2 daughters and a son.

Killed in Laboratory

C. O. North, 45, Ohio-Apex general manager, following explosion and fire in the Charleston, W. Va., plant, Feb. 5th.

C. O. NORTH

Mr. North had been connected with the plant since '28, and was previously manager of Kavalco Chemical, taken over by Ohio-Apex at that time. He was running a vacuum distillation plant when the explosion occurred. Mr. North is survived by his wife, mother, and 4 sons.

Fay Dies Feb. 10th

Dr. Irving W. Fay, 75, professor emeritus of chemistry, Brooklyn Poly, died Feb. 10th. A New Englander by birth, he gradrated from Harvard, magna cum laude, in '86. After a short period of teaching he studied in Germany under Victor Meyer at Heidelberg and under Emil Fischer in Berlin, receiving his Ph.D. from Berlin in '96. Returning, he taught at Ohio University, Athens, Ohio, for a short time and in 1897 accepted the professorship of chemistry at the Polytechnic Institute. He retired in '32, and made an extensive trip to Europe in the interests of the Chemical Museum at the Institute.

The passing of Dr. Fay removes a man of outstanding character,—one whose influence went far beyond the limits of the science he represented. He showed his students the virility and virtue of true goodliness; of gentleness, kindness, and interest in the welfare of others; the beauty of cultrre—broad all-embracing culture; and the value of truth at all times.

He was the author of a text on coal tar dyes, and published a number of papers on a variety of subjects. He was a member of Pi Kappa Phi and of Phi Lambda Upsilon as well as of the American Association. He was a member of the A. C. S. since 1897.

Other Deaths of the Month

Arthur W. Clark, 57, Kentucky Color & Chemical president, in Louisville, Feb. 1st.

Richard J. Monan, 22, R. & H. Chemicals Division chemist, at Niagara Falls.

Eldon L. Larison, 51, superintendent of

Anaconda acid and phosphate plants, at Anaconda, Mont., Feb. 6th. Mr. Larison was noted as an expert in sulfuric and sulfates production.

James Eakins, 76, former superintendent of Western Chemical, in Denver, Feb. 20.

David L. Williams, Martin-Dennis salesman, in Utica, N. Y., Feb. 15.

Clinton E. Collier, 57, widely known in shellac manufacturing circles and president of H. C. Collier & Sons, in Binghamton, N. Y., Feb. 18.

William C. Read, 48, Union Carbide & Carbon official, suddenly, at his home in Scarsdale, N. Y.

Edward M. Hamilton, 65, noted authority on cyanidation and ore analysis, in Sacramento, Feb. 12th.

Employment Rises

Bureau of employment of the Chemists' Club (N. Y.) reports marked improvement in employment. At the greatest period of distress the Bureau had 3,000 names on its list, the majority with no jobs. At present but 500 are enrolled, and half this number are seeking better positions. A brisk demand and shortage exists for well trained young technical men but the bureau is experiencing difficulty in placing about 65 men who are over 40 years of age.

Bureau is asking executives of several of the larger companies to relax rules which set age limits for new employees. All of the men are highly recommended, have excellent past records, are of good character, possess good personalities but are handicapped by arbitrary age limits.

Paramet Did Not Infringe

Appeals Court Sustains Lower Court in Kienle Patent Suit—Other Litigation—

Paramet Chemical was the winner before the U. S. Circuit Court of Appeals on Feb. 10th, confirming decision of the district court which held that Paramet had not infringed the Kienle resin patent as alleged by G. E.

Universal Oil Products claims infringement of 5 cracking patents in 2 suits filed against Empire Oil & Refining, and Crew, Levick, both Cities Service subsidiaries.

Beck, Koller Trademarks

Patent office has ruled on several proposed trademarks offered by Beck, Koller, Detroit, and contested by Bakelite. Decision states that "Beckolloid," "Beck-O-Lac," and "Beckacite" would be confusingly similar to Bakelite but allows "Beckosol."

"Poly" Offers Doctorate

The Polytechnic Institute of Brooklyn is now offering courses leading to the doctorate in chemical engineering. This was preceded by authorization in '33 to confer the doctorate in chemistry, and last year the 1st candidate was awarded this degree. Brooklyn "Poly," located in the downtown section of Brooklyn, will have special appeal to graduate chemical engineers who are working in the Metropolitan area and wish to pursue a doctorate on a thesis of their own selection or on a problem of their employers. This latter happy combination has made it possible for candidates to work on problems connected with their normal employment. This research on operating plant equipment or development work for plant processes offers a great advantage for the best kind of work leading to a degree for the candidate and substantial results for the industries concerned.

COMING EVENTS

American Association of Petroleum Geologists, 21st Annual Meeting, Tulsa, Okla., Mar. 19-21.

American Water Works Association, Kentucky-Tennessee Section, Lexington, Ky., Mar. 23-25.

American Water Works Association, N. Y. Section, Oswego, N. Y., Mar. 26-27.

American Ceramic Society, 1936 Annual Meeting, Columbus, Ohio, Mar. 29-Apr. 4.

American Water Works Association, Florida Section, Tampa, Fla., Mar. 31-Apr. 2.

American Water Works Association, Canadian Section, Annual Convention, Royal Connaught Hotel, Hamilton, Ont., Apr. 1-3.

Michigan Sewage Works Association, Michigan State College, East Lansing, Mich., Apr. 2-3.

American Water Works Association, Indiana Section, Purdue Univ., Lafayette, Ind., Apr. 7-9.

American Water Works Association, Southeastern Section, Hotel De Sota, Savannah, Ga., Apr. 7-9.

N. J. Water Works Association, Trenton, N. J., Apr. 8.

American Petroleum Institute, Division of Production, Southwestern District, Washington-Youree Hotel, Shreveport, La., Apr. 9-10.

Western Petroleum Refiners Association, Elms Hotel, Excelsior Springs, Mo., Apr. 9-10.

American Water Works Association, Illinois Section, Evanston, Ill., Apr. 9-10.

American Chemical Society, 91st Meeting, Kansas City, Mo., Apr. 13-17.

American Petroleum Institute, Division of Production, Pacific Coast District, Annual Spring Meeting, Los Angeles, Cal., Apr. 14.

American Institute of Mining and Metallurgical Engineers, Open Hearth Conference, Detroit, Mich., Apr. 16-17.

National Petroleum Association, Semi-Annual Meeting, Cleveland Hotel, Cleveland, Apr. 16-18.

Electrochemical Society, Spring Meeting, Cleveland, Ohio, Apr. 23-25.

American Gas Association, Natural Gas Dept., Annual Meeting, Dallas, Tex., May.

6th National Premium Exposition, Palmer House, Chicago, May 4-8.

Tanners' Council of America, Spring Meeting, White Sulphur Springs, W. Va., May 7-8.

American Institute of Chemists, Annual Meeting and Medal Presentation, Buffalo, N. Y., May 9-10.

American Petroleum Institute, Mid-Year Meeting, Mayo Hotel, Tulsa, Okla., May 13-15.

Natural Gasoline Association of America, Mayo Hotel, Tulsa, Okla., May 13-15.

International Petroleum Exposition and Congress, Tulsa, Okla., May 16-23.

American Gas Association, Production and Chemical Conference, N. Y. City, May 25-27.

American Electro-Platers' Society, Annual Convention, Cleveland, Ohio, June 1-4.

American Association Cereal Chemists, Annual Meeting, Adolphus Hotel, Dallas, Tex., June 1-5.

American Water Works Association, Annual Convention, Biltmore Hotel, Los Angeles, Cal., June 8-12.

American Society of Mechanical Engineers, Dallas, Tex., June 17-20.

Chemical Engineering Congress, Central Hall, Westminster, England, June 23-27.

American Society for Testing Materials, Annual Meeting, Chalfonte-Haddon Hall, Atlantic City, N. J., June 29-July 3.

American Chemical Society, Semi-Annual Meeting, Pittsburgh, Sept. 7-12.

American Gas Association Convention, Atlantic City, N. J., Week of Oct. 26.

American Association Textile Chemists and Colorists, Annual Meeting, Providence, R. I., Dec. 4, 5.

"Achema VIII," Plant exhibition, in connection with 50th General Meeting of Verein Deutscher Chemiker, Frankfurt, Germany, Sept., 1937.

LOCAL*

Mar. 19. Drug & Chemical Section, N. Y. Board of Trade, Annual Dinner, Waldorf-Astoria.

Apr. 10. N. Y. Section, A.C.S., Regular Meeting.

May 8. N. Y. Section, A.C.S., Joint meeting with N. Y. Section, Society of Chemical Industry; A.C.S. in charge.

* Meetings held at Chemists Club unless otherwise noted.

Chemists' Club Picks Slate

Zinsser Nominated for Presidency—Other Association News—

Chemists' Club nominating committee, headed by Dr. F. J. Metzger, selected the following slate for the '36-'37 period at a recent meeting: president, Dr. F. G. Zinsser; resident vice-president, Prof. Arthur W. Hixson; non-resident vice-president, Victor G. Bloede; suburban vice-president, Dr. R. J. Moore; secretary, S. J. White; treasurer, R. T. Baldwin; trustees for 3-year term, Dr. L. W. Bass and C. W. Fairbank.

Association Briefs

Frederic Rosengarten, W. T. Taggart, and J. G. Vail are appointed by A. C. S. President Bartow as delegates to the 40th Annual American Academy of Political and Social Science meeting, to be held Apr. 24-5 in Philadelphia.

Chief Chemist Per K. Frolich, of Standard Development, told the N. Y. Electrical Society members last month that "improvements in refinery methods have resulted in a steady decrease in the cost of gasoline but the extent has not always been obvious to the public because of increased taxation."

Glycerine Producers' Association is cooperating with Miss Helen Gwetholyn Rees, food consultant, in working out recipes in which glycerine is employed.

Philip Rowe, P. N. Rowe Co., is elected president of U. S. Shellac Importers Association, at annual meeting. Other new officers include Morris Rosen, Mantrose Co., new v.-p., and L. Babbage, Wm. Zinsser, secy.-treas.

A. S. Wittenberg, of Stroock & Wittenberg, succeeds Gordon Brown, of Bakelite, as head of the Synthetic Resin Manufacturers' Association.

Fourth Annual Mineral Industries Conference of Illinois, in which the State's mineral and engineering organizations will participate, will be held at Urbana, Apr. 24 and 25.

Wheeler Elected V.-P. of A. D. Little, Inc.

Valentine, Well-Known in Chemical Circles, Joins Patterson Foundry—Wyatt Now Warner Assistant Sales Manager—Personnel Changes of the Month—

Thorne L. Wheeler is an Arthur D. Little, Inc., vice-president. Following graduation from Yale in '09 and M. I. T. in '11, he went with Southern Cotton Oil as chemist and had become works superintendent at the time of the War, when he served in the Chemical Warfare Service as major in the Technical Development Dept. on the large scale development of charcoal and soda lime manufacture for gas masks. He then became partner with Wheeler and Woodruff, Consulting Chemical Engineers, joining Arthur D. Little, Inc., in '25. Company also announced the re-election of Earl P. Stevenson, president, Raymond Stevens, vice-president, Alexander Whiteside, secretary, and Roger C. Griffin, treasurer.

Kenneth S. Valentine is the new Patterson Foundry & Machine N. Y. district sales manager. He was sales manager of Turbo Mixer for 8 years, until resigning to become connected with the Patterson Co. Previous to his connection with Turbo Mixer he was a chemical engineer at Heller & Merz (now Calco Chemical) and works manager at Southern Dyestuffs (now Monsanto Chemical) of Nitro, W. Va. Mr. Valentine is well known in the chemical and process industries, and is co-author of the section, "Mixing of Material" in "Chemical Engineering Handbook," as well as various books and articles on mechanical problems of the process industries. He graduated from Columbia in '16. Mr. Valentine will have charge of sales in Metropolitan New York and in New England, and will, in addition, act in an advisory capacity on mixing problems in general.

KENNETH S. VALENTINE

Knows both sides of the chemical field.

W. Newell Wyatt, known to his intimates as "Shorty," is promoted to the assistant sales managership of Warner Chemical. Present line-up of the Warner sales department is as follows: Louis Neuberg, vice-president and director of sales; F. A. Neuberg, vice-president and sales manager; W. Newell Wyatt, assistant sales manager.

Others in New Positions

Kentucky Color & Chemical's new president is Dr. George A. Goodell, succeeding the late Arthur W. Clark. Dr. Goodell is a co-founder of the company, and has been v.-p. and general manager since that time.

M. D. Craig, formerly with Murray Oil Products, is now associated with L. N. Jackson & Co., N. Y. City, importer of chinawood, perilla, oiticica and fish oils and varnish gums.

Edward J. Bernhardt succeeds the late Charles B. McCloskey, as Pittsburgh district manager, R. & H. Chemicals Division of du Pont.

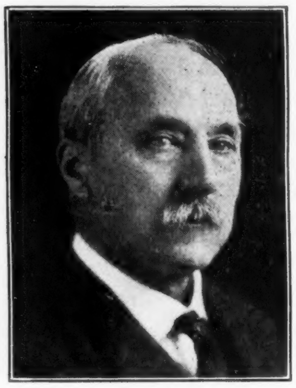
E. C. Wood, formerly with C. K. Williams, is now associated with D. H. Litter Co., N. Y. City.

Cabot Gives $144,000 for Aviation

Prominent Carbon Black Manufacturer Seeks to Establish American Air Supremacy—Reese Honored by "Old Heidelberg"—Others Who "Made News" in February—

Almost breath-taking in its munificence is the recently announced gift of Godfrey L. Cabot, of Godfrey L. Cabot, Inc., carbon black, to the cause of aeronautics. Donation ($144,000) would have been a tidy sum to give away even way back in the booming 20's, but in the busted 30's it is a sensation. Furthermore, a gift of any amount for the advancement of aeronautics would look sensational to anyone familiar with the history of flight; for progress in the science (aside from military subsidies) has been largely made without the stimulus of big endowments. The epochal work of the Wrights was made unaided—actually in the face of opposition and ridicule—and, until the war came along a dozen years later and poured gold into the coffers of research, the early experimenters got little help from governments or individuals.

Today, what with the magnificent work of the National Advisory Committee for Aeronautics and lesser institutions, research is on a healthy footing, but there is still room for much to be done in behalf of navigational aids and practices. At any rate, so Mr. Cabot thinks, and it is in the furtherance of these things that he aims to have his gift applied.



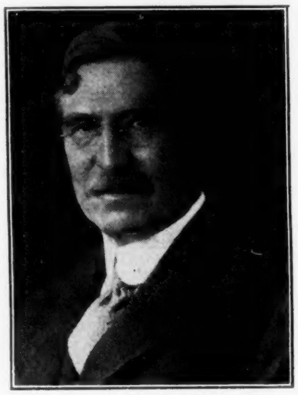
GODFREY L. CABOT

Wants the U. S. mistress of the air.

"I desire," says he, "for the United States of America the same service to the navigation of the illimitable air that England has rendered to the navigation of the salt seas."

A Coincidence of Birthdays

Dr. Charles L. Reese, du Pont director, and for many years its chemical director, was honored last month by the German university at which he was a student half a century ago.



DR. CHARLES L. REESE

Will live again his student days at Heidelberg.

February 26 was the 50th anniversary of the day that Dr. Reese received the degree of doctor of philosophy from the University of Heidelberg. In commemoration of the anniversary and in recognition of his achievements since that time, his German alma mater has conferred upon him the degree of doctor of natural science.

It so happened that Dr. Reese's graduation from Heidelberg coincided with the 500th anniversary of the founding of that venerable institution. The dean of the university also has sent Dr. Reese an invitation to revisit Heidelberg for the

550th anniversary celebration this year as a guest of the university.

Dr. and Mrs. Reese are now in Ocala, Fla.

Du Pont's research chemist, Dr. J. K. Hunt, told Wilmington Rotarians last month that the 1st Cellophane sheet was made at Buffalo, and since then a quantity sufficient to encircle the globe with a band 200 miles wide had been made. While Cellophane was developed through the efforts of British chemists and the process completed by Brandenburg, French chemist, the du Ponts developed the moisture proofing of Cellophane and are now producing a metallized Cellophane.

Winter Vacationists Reported

Stanley Weil, Natural Products Refining vice-president, will return from Hollywood, Fla., early in March. "Bob" Wishnick, president, Wishnick-Tumpeer, spent most of February at his home in the same city. Frank J. McDonough of N. Y. Quinine & Chemical, spent 2 weeks at Miami. Stanley Daggett, president, Stanley Daggett, Inc., paint raw materials, is combining pleasure and business in Florida.

And, in Addition

E. Y. Burcholter, of Cyanamid's paper division, has returned from Florida where he spent several weeks recovering from illness.

C. P. Hall, Akron, Ohio, chemical distributor, returns to his office after month's trip to California.

Fred A. Beer, Western Dry Color president, Chicago, is recuperating from his recent illness at Scottsvale, near Phoenix, Ariz.

Thomas R. Procter, Procter & Johnson president, Chicago, and Mrs. Procter recently spent several weeks on extended tour of the southwest and Mexico.

T. J. Starkie, Wishnick-Tumpeer v.-p., returns with his wife and son from winter vacation in California.

Fred A. Whitaker, General Ceramics plant superintendent, at plant No. 1 Perth Amboy, and an outstanding authority on the production of ceramic ware for the chemical and allied process industries, will combine business with pleasure on extended trip to England and the continent.

Carothers, du Pont, Married

Dr. Wallace H. Carothers, du Pont research chemist, who carried on Dr. Nieuwland's work on the production of synthetic rubber (DuPrene) to a successful conclusion, was married Feb. 21st, to Miss Helen E. Sweetman, also connected with the du Pont organization.

Other marriages of the month: Fletcher W. Rockwell, production manager and director, National Lead, to Mrs. Frances Sparks Grosset on Feb. 1st; Peter Kovol, Chicago sales staff, United Color & Pigment, to Miss Ethyl Bepko on Feb. 22nd.

Names in the News

Penn Salt officials whose names made news last month included Leonard T. Beale, president, who was elected to Pennsylvania Bell Telephone board of directors, and Col. N. E. Bartlett, vice-president, now president of Chemical Club of Philadelphia.

Dr. C. M. A. Stine, du Pont vice-president and one of the country's outstanding technicians, urged railroad executives to

DR. C. M. A. STINE

"The railroads need more research."

adopt modern research methods in a speech delivered at the 9th annual dinner of the Wilmington Traffic Club and attended by a large group of transportation executives from all sections of the country on Feb. 11th at the Hotel du Pont.

Mrs. Edith Bartow Riker, widow of John J. Riker, former partner in the famous Riker firm, distributors of chemicals, which later was taken over by the late Joseph Turner, left an estate of nearly $4,000,000, tax appraisal shows.

Dr. Charles A. Kraus, Brown University chemistry head, will receive the William Richards Medal in Boston, Apr. 10th.

Prof. Moses Gomberg, Michigan, was honored Feb. 8th, his 70th birthday, at a dinner attended by over 70 of his former students.

Joseph A. Huisking is the new vice-president of the Drug & Chemical Club, downtown N. Y. City luncheon club.

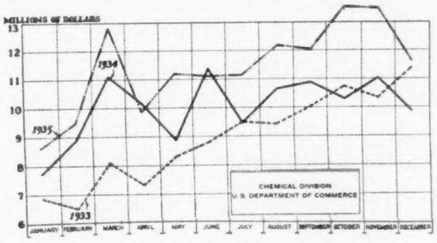
New members elected to N. Y. Chemists' Club last month included: G. S. Armstrong, N. Y. City consultant; Morse G. Dial, Carbide & Carbon; Waldron C. Beekley, Whitlock Coil Pipe v.-p.; Willard A. Kates, Corning Glass; Per K. Frolich, research head for Standard Oil Development; Ferdinand Kump, Hammond & Littell patent law expert; and G. J. Pritchard, S. B. Penick.

Dr. Wilbert J. Huff, former Johns Hopkins engineering professor, is now chief chemist of explosives division, Bureau of Mines, Washington.

U. S. Chemical Exports to Germany Unchanged in '35

While Totals are Approximately the Same There Are Important Shifts in Items—U. S. Shipments to Territories Total $11,602,600—I. G.-Japan Sign Dye Agreement—

Notwithstanding Germany's efforts to reduce imports in order to relieve the foreign exchange shortage which has become so acute of late, its purchases of



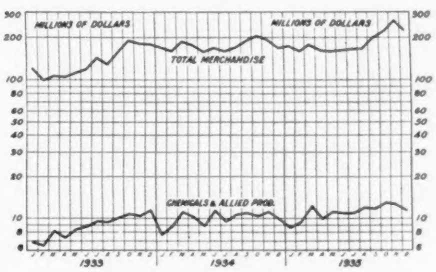
U. S. Exports of Chemicals and Allied Products Charted.

American chemicals, amounting to approximately $12,400,000 in '35, were approximately the same as for '34.

While the total value of her purchases was maintained at about the same level there were considerable changes among the various items making up the trade, and the favorable showing in '35 was due in large measure to heavier purchases of American phosphate rock, benzol and carbon black. Purchases of these 3 leading items increased about 50% over the '34 figure.

Germany's imports of carbon black, which are obtained almost entirely from the U. S., attained a new peak level in '35, far surpassing any previous year. With phosphate rock and benzol, the U. S. not only increased its sales to Germany, but obtained a larger share of the country's total import trade in such products in '35.

Most other chemical products imported from the U. S. by Germany during '35 registered losses compared with the preceding year although in most cases declines were due to smaller demands for such products, rather than to gains achieved by competing countries. Thus,



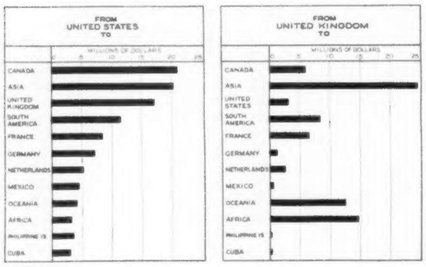
U. S. Exports of General Merchandise and Chemical and Allied Products Compared.

while American deliveries of naval stores to Germany showed considerable losses

during the year, the U. S. nevertheless increased its share of Germany's total imports of gum rosin and maintained its position with respect to turpentine.

Territories Good Customers

Shipments of chemicals and related products from Continental U. S. to the Territories of Hawaii, Puerto Rico and Alaska continued at high levels during '35 and aggregated $11,602,600 compared with $10,950,280 for '34. Each Territory in-



Chemical Shipments of U. S. and U. K. Analyzed According to Destination.

creased its chemical purchases from the mainland during the year, largest increase being recorded in sales to Puerto Rico. Compared with '34, Hawaii's purchases from continental U. S. increased from $5,063,330 to $5,150,000; Puerto Rico's from $4,776,390 to $5,253,000; and Alaska's from $1,110,560 to $1,199,500, preliminary statistics show.

While a very wide line of chemicals and related products were shipped to the Territories in '35, bulk consisted as usual of fertilizers, industrial chemicals and chemical specialties, soaps and toilet preparations, medicinals, paints, and industrial explosives—these groups together comprised approximately 95% of the total chemical trade.

All major classifications of chemicals and related products shipped from Continental U. S. to Hawaii, with the exception of fertilizers, registered substantial gains in '35 compared with the preceding year. Fertilizer shipments, however, declined from 58,739 tons to 48,105 tons. Puerto Rico, on the other hand, increased its purchases of fertilizers from 66,765 tons to 73,060 tons. Alaska purchased 2,727,800 lbs. of industrial explosives, chiefly dynamite, valued at $368,600 in '35 compared with 2,635,400 lbs., valued at $354,300 during the preceding year.

Split China Dye Market

The I. G., carrying out its traditional policy of settling international trade rivalries by means of cartel pacts, has recently entered into an agreement with Japanese manufacturers regarding the sale of indigo dyes in the important Chinese market. It is understood that German dye producers endeavored to obtain a more comprehensive agreement relative to the Oriental dye trade, but the Japanese confined the pact to indigo.

Japan, with its growing coal-tar dye industry, has become an important factor in Far Eastern dye markets in recent years, particularly in China which has a large domestic textile industry, and it is anticipated that the German Dye Trust will continue its efforts to negotiate a general dye agreement with Japanese producers, report from Germany to the U. S. Bureau of Foreign and Domestic Commerce states.

German Chemical Notes

German-South African barter agreement has been extended for one year ending Dec. 1, '36, during which goods up to the value of £3,000,000 will be exchanged, according to a report from the American Commercial Attache at Johannesburg. Under the terms of the agreement Germany specifies what may be purchased from South Africa during the period and how much of each item, the list covering most of the principal products of the Union.

I. G. employment totals rose to 97,490 on Nov. 1, '35, as compared with 92,314 on Jan. 1, '35, and 63,576 on Oct. 1, '32, the low point in employment. Practically all employees are on a 5-day, 40-42 hr. week. The I. G. is said to account for 40% of German chemical production.

German legislation which has been in force for several years according sellers of fertilizers and seeds prior mortgage rights upon farmers' crops has been extended to Apr. 1, '37. Law, which is designed to stimulate fertilizer consumption by freeing manufacturers of any hesitancy in extending credit to farmers, has worked very satisfactorily, and has resulted in a steady and notable expansion of Germany's fertilizer consumption since becoming operative. According to law German farmers cannot realize upon crops until seed and fertilizer loans have been liquidated.

German Nitrogen Gains

After losing ground for several years Germany's exports of nitrogen fertilizers made substantial gains in '35, reflecting the beneficial effect of the nitrogen cartel agreement which became effective on July 1, '35.

At the beginning of '36, the cartel, which included synthetic nitrogen producers of Europe as well as the Chilean natural nitrate industry, was joined by Japan, further strengthening the international nitrate distribution agreement.

Germany's nitrogen exports during the 1st 11 months of '35 amounted to 613,265 metric tons compared with 485,320 tons during the corresponding period of the preceding year, and the value received advanced from 40,627,000 ($16,250,800) to 48,531,000 marks ($19,412,400), official German statistics show. Gains were due in large measure to heavier export shipments of ammonium sulfate and calcium nitrate.

Germany's domestic consumption is also gaining. In the agricultural year '34-'35 consumption increased 9% to a total of 425,200 metric tons, thus establishing a new peak equivalent to an increase of over 10% above the '29 record level. From all indications Germany's domestic fertilizer consumption will continue to gain during the current year.

DuPont Company Establishes 12 Fellowships

Notes Increasing Demand for Research Chemists and Shortage of Supply—New Clay Treating Installations Reported—Catalin Licenses Fiberloid — DuPont Holds Advertising "Clinic"—

The duPont Co., noting an increasing demand for research chemists, with a very definite shortage today in that type of scientific workers, and wishing to encourage more promising students in research work in the field of chemistry, has again appropriated sufficient funds to permit establishing fellowships in 12 leading universities and colleges for the academic year '36-'37. Purpose of the plan is to give assistance to a candidate to pursue graduate work in research. Awards to individuals may be granted through competition among selected members of the graduating class, or to a student who has partially completed his post-graduate work. Also, they may be granted to the same individual for successive years, when such procedure is considered desirable to accomplish the purpose of the plan. Universities selected: For chemistry—University of Chicago, Cornell, Harvard, Johns Hopkins, Ohio State, Princeton, Yale, Illinois, Minnesota, Wisconsin. For chemistry or chemical engineering—University of Michigan and M. I. T.

New installations of Gray process clay treating plants affecting a combined gasoline refining capacity of approximately 24,000 bbls. per day are reported by Dr. M. R. Mandelbaum, vice-president of The Gray Processes Corp., N. Y. City. "Activity in clay treating is now at the highest point since 1924," states Doctor Mandelbaum. "The improved trend of gasoline prices is encouraging refiners to improve their competitive position by seeking available methods for producing a more refined high octane gasoline than is possible through the use of inhibitors alone."

Gulf Oil Corporation of Pennsylvania has taken a license for clay treating a substantial part of its cracked gasoline production. It is expected that the first

unit to be constructed under this license will be in operation this spring.

Other Gray process units are being installed by Atlantic Refining at its new Atreco, Texas, refinery, where clay treating will be used to refine both cracked and polymerized gasoline, and also by Pan-American Petroleum and Transport in connection with its new combination cracking unit at Texas City.

The Catalin Corporation of America has licensed Fiberloid Corp., producer of cellulose plastic materials, to manufacture phenolformaldehyde resins of the Catalin type under a royalty agreement.

Du Pont advertising department held a "clinic" last month under the leadership of Advertising Director William A. Hart for 50 members of the division. Mr. Hart discussed the progress being made to interpret to the general public benefits enjoyed by all as the result of scientific research carried on by the du Pont organization to provide "better things for better living through chemistry."

Companies in the News

Monsanto Chemical is reported as purchasing a large phosphate tract in Maury County, South Carolina, from the Hoover & Mason Phosphate Co.

Imperial Oil & Gas Products Co., Pittsburgh, Pa., appoints Hugh S. Stoller, 31 N. Summit st., Akron, agent for the sale of its carbon blacks to the rubber industry in Ohio.

Cyanamid & Chemical is reported taking over several chalk mines in the vicinity of Ivey, Ga. According to rumors, a plant will be erected shortly.

Mathieson Alkali opens offices and warehouse in Charlotte, N. C., at 300 E. 6th st. C. W. Tiffany is in charge.

Grasselli reserves space at the Great Lakes Exposition, to be held late this coming June. Exhibit will dramatize war of chemical industry on rats, termites, and other property-destroying pests.

Baker Extract, Springfield, Mass., will join other Massachusetts manufacturers in fighting Gov. Curley's proposal of a 40c per 100 proof gallon tax on industrial alcohol.

National Powder, Eldred, Pa., answers protest from the Eldred Safety Committee against construction of new plant, asserting that nearest building will be located far enough away from highway to comply with local regulations.

Barsky & Wilson, N. Y. City consulting firm, is now Barsky & Straus, Inc.

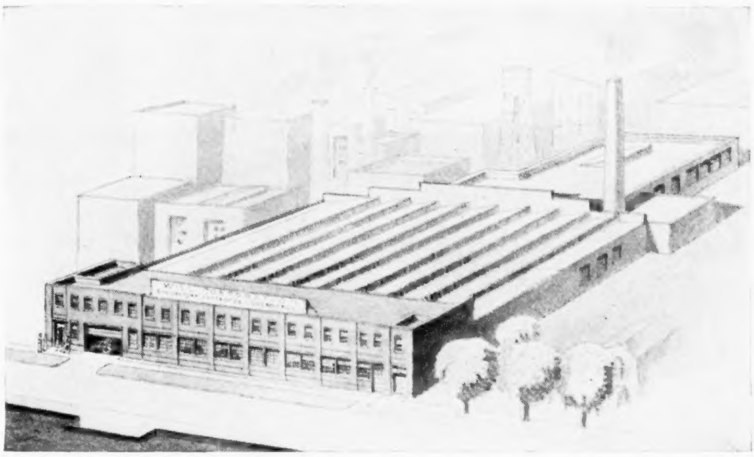
General Plastics, Inc., manufacturer of Durez resins, appoints William H. Scheel, Inc., 193 Water st., N. Y. City, as representative, and O. L. West, Drexel Bldg., Philadelphia, in a similar capacity in that city.

Fires Reported in February

Fires reported in February included: Carbide & Carbon Chemicals, 4-story building at the Charleston, W. Va., plant, $3,000, 10th; Swift & Co., Chicago gas plant, following hydrogen gas explosion resulting in 2 deaths and over 15 injuries, 13th; International Printing Ink, 3-story building in St. Louis, $50,000, 12th; White Tar Co., Kearny, N. J., $5,000, 12th; and American Cyanamid, Linden, N. J., sulfur plant, $3,000, 11th.

Will Corp.'s Headquarters

The Will Corp., laboratory supplies, has removed offices and stockrooms to a new building, 39 Russell st., Rochester, N. Y. Building was specially designed to house increased stocks which now comprise about 20,000 items and sizes and to facilitate the handling of laboratory equipment, glassware, and chemical reagents. More than 25,000 sq. ft. of new steel shelving have been installed and a separate building has been erected for the glass blowing department.



New building erected by the Will Corp., Rochester, N. Y., laboratory supplies.

Others in New Addresses

Ertel Engineering, filtering, filling equipment specialist, is now in greatly enlarged quarters at 120 E. 16th st., N. Y. City, where offices and factory are combined.

George Uhe, N. Y. City broker, is moving to larger quarters at 80 8th ave.

F. H. Perry & Co., Chicago vegetable adhesive manufacturer, is now in a greatly enlarged plant at 1533 Riverside Drive.

Chemical Construction Gains

Rapid development of new processes and products is reflected in construction contracts awarded by chemical companies for the past month. Solvay's $1,000,000 plant for liquid chlorine and sodium nitrate production is going forward rapidly. Cincinnati Chemical has awarded contracts for one-story plant at St. Bernard, Ohio, estimated to cost $50,000. Other construction plans include: Carolina Aniline & Extract, Charlotte, N. C., one-story plant, $15,000; National Oil Products, purchase of property and buildings adjoining the Harrison, N. J., plant; Burkart-Schier Chemical, purchase of property near Chattanooga plant, $15,000; Ansul Chemical, Marinette, Mich., new research laboratory; Schundler & Co., new feldspar-processing plant near Custer, S. D.; and B. Preiser Co., Charleston, W. Va., dealer, plans for 2-story office and warehouse.

Southern Chemical, newly formed at Charlotte, N. C., will erect a $100,000 plant to manufacture dyestuffs in the heart of the southern textile industry. President John L. Crist was formerly Calco's southern sales manager. Arthur J. Buchanan, widely known in southern textile chemical specialty manufacturing circles, is vice-president, and Leland G. Atkins, former Mathieson Alkali superintendent at Saltville, is plant manager.

Propionic Import Ruling

Bureau Fixes Rate at 25%—New Regulations on Flaxseed and Linseed Drawbacks—

Customs Bureau has ruled that propionic acid imports must be taxed at 25% as an acid not specially provided for. Question involved was whether the acid derived from acetic acid waste residue should take a 10% duty. Bureau held to the theory that the product is a distillate obtained from the residue. Change in classification will be effective as to shipments entered after Mar. 14th.

Customs Bureau has withdrawn separate drawback regulations under which certain companies processed imported flaxseed and exported linseed oil and cake and has issued general regulations.

Tariff Commission has released "Analysis of Miscellaneous Chemical Imports Through N. Y. in '35."

Will & Baumer's auditor, Charles A. Flannery, told members of the Syracuse Scottish Rite Club last month some of the early history of that company, founded by Mr. and Mrs. Will in the kitchen of their home.

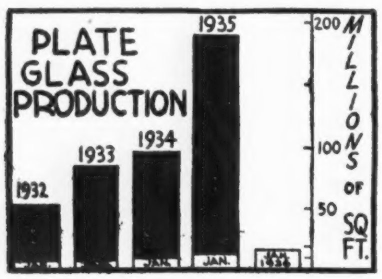
February Chemical Shipments Below Expectations

Purchasing of Industrial Chemicals Still Restricted—Seasonal Pick-Up Expected Momentarily—Outlook in Glass Industry Bright—Phosphates and Caustic Competitive—

The slow pace of January carried over into February and tonnages shipped against contracts and spot sales were disappointing. Severity of the weather in most parts of the country had a decidedly bad effect on business and manufacturing operations, but other factors, such as the strike situation in the Akron area, exerted a bearish influence too. Business executives generally are of the opinion, however, that the January-February lull is merely of a temporary nature and the usual spring expansion will be all the greater because of the backlog created in the 1st 60 days of the year.

Of all the industries which are important consumers of chemicals, the glass and paper fields are at the moment showing the greatest activity. Bad weather has delayed the paint industry's spring start and has also caused the fertilizer mixers to postpone production to some extent. The automotive sections were comparatively slow in February and a "sit-down" strike in one of the largest Akron tire plants was called late in the month. On the other hand, steel activity went above the 50% mark, largely on the improved demand from the railroads. The situation in textiles still remains spotty. Rayon production is satisfactory, but the uncertainties over silk were naturally augmented by the Japanese political situation.

December plate glass production reached 16,122,218 sq. ft., bringing the '35 total to 179,816,459 sq. ft. as compared with 94,-566,978 in '34. This surpasses the record year '29 when 150,498,287 sq. ft. were



produced. Figures released by the Glass Container Association indicate that '35 bottle production was 7½% greater than '34. Despite the competition of can companies in the beer field, bottle production is increasing and plans are laid for the production of 230,400,000 bottles, an increase of 2% over '34. A 9% increase in liquor bottle production is anticipated in '36 and a substantial gain in milk bottle production too is confidently expected. January total of 17,275,632 sq. ft. of plate glass was ahead of the 13,265,188 sq. ft. produced in January, '35, a gain of 29%.

Important Price Changes

ADVANCED

	Feb. 29	Jan. 31
Molybdenum, powd.	$1.80	$1.65
Sodium stearate	.22	.21

DECLINED

Antimony oxide	$0.13½	$0.13¾
Cobalt acetate	.58	.60
Sodium antimoniate	.12¾	.13¼
Tin crystals	.36½	.37

DEPT. OF LABOR STATISTICS

	Jan.'36	Dec.'35	Jan.'35
Employment *a*	107.4	108.8	103.0
Payrolls *a*	99.7	102.1	90.8

DATA FOR PROCESS INDUSTRIES

	Jan.'36	Dec.'35	Jan.'35
Explosives:			
Employment *a*	86.8	86.7	88.1
Payrolls *a*	75.8	76.2	68.3
Soap:			
Employment *a*	97.1	97.3	99.1
Payrolls *a*	94.9	94.6	90.7

	Jan. '36	Jan. '35
Exports	$1,708,000	$1,784,000
Imports	1,624,000	1,504,000
Crude sulfur, exports	732,000	402,000
Indus. Chemical Specialties, exports	1,279,000	1,506,000

a 1923-1925=100.0.

The outlook then in the glass field is bright. The auto industry's recovery is the biggest factor and improved construction outlook helps the picture tremendously.

Few Price Changes Reported

Published price changes were few in February, but the weakness in di- and trisodium phosphate continues as does also the competitive condition, particularly in the N. Y. Metropolitan area, in caustic. Further, some talk of weakness in the l.c.l. "bicarb" market in and around the N. Y. City and Philadelphia markets is heard but not confirmed. The international Tin Committee has reduced the tin production quota from 90 to 85% of the '29 level, and this action, plus the temporary distress of a Japanese freighter due with a large tin cargo, has stabilized the tin salts after several months of weakness.

Methanol Production Gains

Final statistics on the production in '35 of both crude and synthetic methanol became available. They were obtained by the Census Bureau from 33 manufacturers, and those for '34 from 36 makers. Four manufacturers went out of the methanol field and one began reporting in January, '35. Crude '35 total was 5,048,720 gals., as compared with 4,121,647 gals. in '34. Synthetic total for '35 was 18,046,929 gals., as compared with 12,534,424 in '34.

Duval's Output Reported

Duval Texas Sulphur's production from its new deposit at Boling Dome has amounted to 58,248 tons during the period from Sept. 1, '35, when commercial output started, through January, '36. Monthly production has been as follows: September, 6,642 tons; October, 12,068 tons; November, 19,917 tons; December, 9,101 tons and January, 10,520 tons.

Under terms of an agreement with Texas Gulf Sulphur, between 40% and 45% of Duval's production from this property must be delivered to Texas Gulf at a price in the neighborhood of cost. Texas Gulf share of this production is apparently 27,632 tons.

Duval's sales since Aug. 31 have been as follows: September, 45 tons; October, 1,972 tons; November, 1,965; December, 8,852 and January, 10,089, total of 22,925 tons.

Greater than Seasonal Gain in Fine Chemicals

Prevalence of Cold-Weather Sicknesses Causes Jump in Consumption of Some Items—Nay Heads Mallinckrodt's Chicago Office—Lea Now Handling Merck Chemicals—

Greater than the usual seasonal increase in influenza and other cold-weather diseases has brought about a sudden rise in the demand for certain fine chemicals and pharmaceuticals. The firm position of mercury and the scarcity of supplies, either domestic or imported, continued last month. The competitive situation in the mercurials seems to have disappeared to a large extent. Bismuth salts were steady at unchanged levels. The situation in silver nitrate also remained unchanged. In general, the price structure was one of great firmness.

Talc Deposit Reported

Sierra Talc, Los Angeles, is opening new talc deposit in the White Mountains of Inyo County, Cal. Construction of mining camp is now under way.

Important Price Changes

ADVANCED

	Feb. 29	Jan. 31
Cadmium	$1.05	$0.85
Corn syrup, 42°	3.15	3.05
43°	3.20	3.10

DEPT. OF LABOR STATISTICS

	Jan.'36	Dec.'35	Jan.'35
Employment, Druggist's preparations *a*	97.6	98.8	101.3
Payrolls, Druggist's preparations *a*	95.3	97.2	96.8

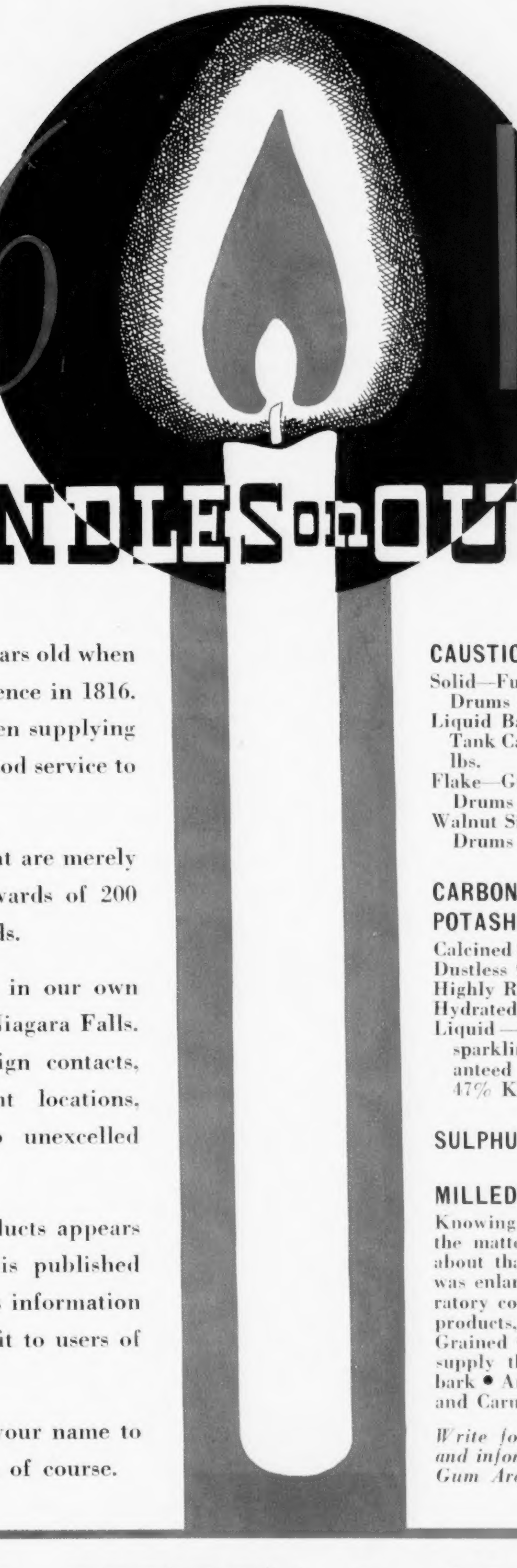
a 1923-1925=100.0.

Company Notes

Mallinckrodt's Chicago office is now headed by Walter Nay, succeeding the late Euclid Snow.

Lea Manufacturing, Waterbury, Conn., is now carrying stock of Merck's laboratory chemicals.

1816 1936



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The republic was only forty years old when this Company came into existence in 1816. For just 120 years we have been supplying good chemicals—and giving good service to American industry.

The products listed at the right are merely a few out of a range of upwards of 200 industrial basic chemical needs.

Many of these are produced in our own factories at Jersey City and Niagara Falls. Our domestic facilities, foreign contacts, and branches in convenient locations, enable us to serve you to unexcelled advantage.

A complete list of ISCO Products appears in the ISCO NEWS. This is published several times a year and gives information of interest and potential profit to users of industrial chemicals.

It will be a pleasure to add your name to our mailing list. No charge, of course.

CAUSTIC POTASH ●
Solid—Fused 88-92%
Drums 550-700 lbs.
Liquid Baume 45°
Tank Cars, Drums 675 lbs.
Flake—Ground
Drums 100-225-550 lbs.
Walnut Size
Drums 100-225-550 lbs.

CARBONATE OF POTASH ●
Calcined 80-85%, 96-98%
Dustless 98-100%
Highly Refined 99-100%
Hydrated 83-85%
Liquid — water white, sparkling clear; guaranteed minimum of 47% K_2CO_3

CAUSTIC SODA ●
Solid—Fused 76%
Drums 700 lbs.
Flake 76%
Drums 125 and 400 lbs.
Crystals and Ground
Bbls. 500 lbs. Drums 400 lbs.
Liquid—Basis 76%
Tank Cars and Drums 675 lbs.

CHLORIDE OF LIME ●
35-37% (Bleaching powder). Drums 100-300-850 lbs.

IRON CHLORIDE ●
C. P. Lumps
Bbls. 500 lbs.

SULPHUR CHLORIDE ● Drums and Tank Cars

MILLED GUMS and REFINED WAXES ●
Knowing that these products could be improved in the matter of uniformity, we undertook to bring about that improvement • Our Jersey City plant was enlarged and equipped to process, under laboratory control, a number of dependable and clean products, including Powdered, Granulated and Grained Gum Arabic and Gum Karaya • We now supply these in all meshes, free from dust and bark • And try our Refined Beeswax—and Ceresine and Carnauba Waxes. You'll like them.

Write for our pamphlet giving worthwhile hints and information on Locust Bean Gum, Gum Karaya, Gum Arabic and Gum Tragacanth.

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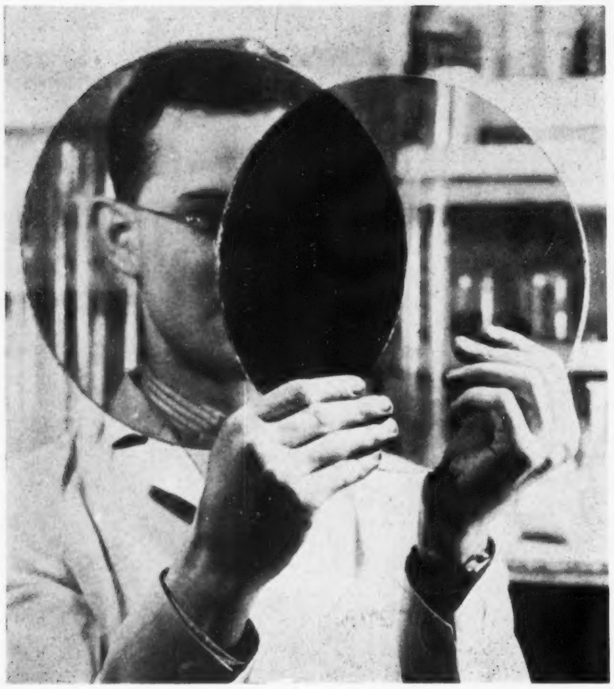
CHEMICAL

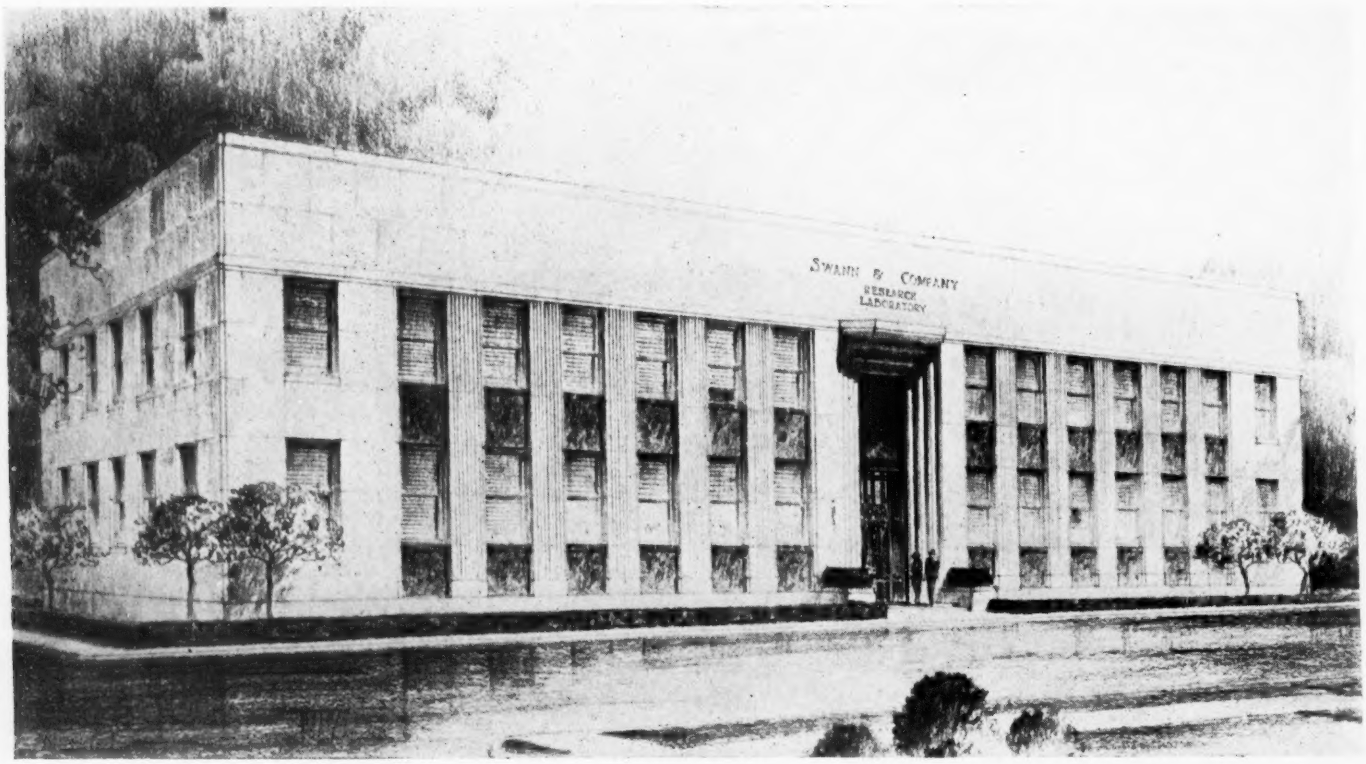
The Photographic Record



Polaroid, the new glass that polarizes light, is an invention of Edwin H. Land, Boston scientist. Single sheets are as clear and colorless as ordinary window glass; two sheets, one over the other, may be perfectly clear, or perfectly black, depending on how they are turned in relation to each other.

John M. Lovejoy, new president of the American Institute of Mining & Metallurgical Engineers, is a petroleum geologist and oil company executive, with a broad background of mining engineering experience.

The recently opened research laboratory of Swann & Company, Birmingham, Ala. Many unique features are planned which promise interesting developments. The building is constructed of Alabama limestone, with green stone spandrels between the windows, and black marble entrance.



NEWS REEL

of Our Chemical Activities

W. E. Phillips, Mathieson Alkali Works, Inc., Manager Chicago office.

Clarence Morgan, Clarence Morgan, Inc., Chemical Distributor.

Left, E. F. Heizer, American Cyanamid & Chemical Corp., in charge of sales at Chicago.

Above, C. D. Morris, Merchants Chemical Co.

Charles W. Klaus, Benner Chemical Co.

G. S. Thayer, Mathieson Alkali Works, Inc.

Below, J. M. Murphy, Solvay Sales Corp.

CHICAGO CHEMICAL SALESMEN

Chicago buyers of chemicals know these men—Leaders of this industry's shock troops in the key salient of the Middle West chemical market are pictured above. These branch managers and sales heads of local distributing organizations carry the brunt of the competitive battle in this territory.

STANDARD Bichromates

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BICHROMATE OF POTASH

CHROMATE OF SODA

PRIOR CHEMICAL CORP.

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Selling Agents for

STANDARD CHROMATE CO., INC., PAINESVILLE, OHIO

Trend in Textiles and Tanning Mixed

Chemicals Purchased in Conservative Quantities—Shoe Production Set Record in '35—Threatened N. Y. Dress Strike Settled—Dextrin and Starch Prices Advanced—

Little if any change occurred in activity in either textiles or tanning in February over the previous month. Both trades are still somewhat beset by uncertainties. The weather and labor troubles are blamed for much of the delay in the failure to resume a strong forward movement. As a result, textile and tanning chemicals were purchased in conservative quantities last month.

Yet certain divisions of the textile field are decidedly active. Cotton consumption in January was reported by the Census Bureau to have totaled 591,309 bales of lint and 55,974 of linters, compared with 498,329 and 55,170 for December last and 550,553 and 61,024 for January last year. Likewise, consumption of raw wool in January again turned upward after showing sharp declines in the last 2 months of '35 and was ahead of consumption in January of last year. Silk deliveries to American mills (including re-exports) in January amounted to 38,995 bales which represents an increase from the 35,559 figure of December '35, but which is below the '35 monthly average delivery of 41,400 bales. Seasonally corrected, however, these deliveries showed a substantial decline. The Paterson and Passaic dyeing centers are still slow, and the movement of plants away from those sections seems to be increasing rather than diminishing. However, a particularly bright spot in the textile picture last month was the settlement of the threatened N. Y. dress strike.

As the final figures for '35 become available it becomes evident that the textile industry as a whole enjoyed a good year. Considering the '36 outlook in the light of the "2-year cycle" theory the current 12 months' period should show a decline; but the overwhelming sentiment in the industry appears to be one of distinct optimism, and many executives freely predict that the theory will not run true to form this year.

Important Price Changes

ADVANCED

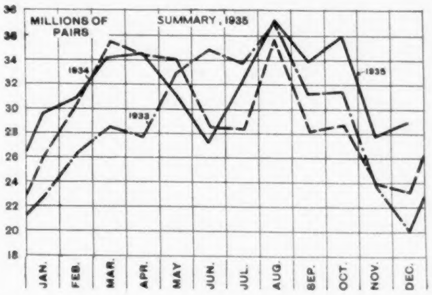
	Feb. 29	Jan. 31
Corn sugar, tanners	$ 3.18	$ 3.08
Dextrin, corn	3.55	3.45
British Gum	3.80	3.70
White	3.50	3.40
Mangrove Bark	27.00	26.00
Starch, pearl	3.09	2.99
Powd.	3.19	3.09

DECLINED

Albumen, egg	$0.79	$0.80
Egg yolk	.51	.52

Shoe Production Outlook

Unless retail shoe sales show a substantial improvement during the spring, production may decline sharply after the current heavy spring runs have been completed. The record-breaking output during '35 resulted in building up inventories. January output, estimated to have exceeded the '35 level by at least 1,000,000 pairs, added to stocks. February production ran at about the same level as last year. February shoe sales were disappointing because of adverse weather conditions, but January sales of shoe chains in the East, on the other hand, recorded a very sharp gain over those of the same period last year, so that manufacturers at the moment are uncertain.



Shoe manufacturers set a new production record last year.

Shoe production in '35 set an all-time record with a total of 383,761,499 pairs against 357,000,000 in '34, an increase of about 7½%. Divergence of opinion exists over the likelihood of '36 surpassing last year in volume, but that it will be a satisfactory one, there is little doubt among the leaders of the industry.

Considerable impetus to the tanning industry is expected to follow the 17th cooperative display of fall and winter leathers by members of the Tanners' Council, scheduled for the Waldorf in N. Y. City, Mar. 30-31.

The number of hides put into the process of tanning during December was 1,688,000, which was slightly less than November's 1,646,000 and considerably larger than the 1,476,000 during December, '34. Total of wettings of cattle hides in '35 stands at 19,034,000, as compared with 17,073,000 in '34 and 17,420,000 in '29.

Corn Derivatives Rise

The rise in dextrin and starch prices reflect higher corn prices following the weak period just after the AAA was declared unconstitutional. Zinc dust quotations were also raised last month when the metal price suddenly spurted. Egg products were firmer on the news that stocks of imported abroad are at a very low point. Tallow markets were sluggish with little activity and with generally weaker prices. The competitive situation in sulfonated oils is unchanged. Purchasing of natural tanstuffs and dyestuffs was of a restricted nature but a better demand for synthetic dyes was reported in most quarters.

Fair size sales of dyestuffs are reaching the market for the account of the silk and rayon trades. Dark shades of colors continue in fair demand but there is a growing interest in the brighter colors with indications pointing to a further improvement in the latter with the arrival of the spring season.

Data compiled by the Tariff Commission reveal that dye imports entered for consumption in '35 totaled 3,638,177 lbs. with a value of $5,489,547, compared with 3,392,467 lbs. with a value of $5,035,028 in '34.

Fish oils closed the month at 45c in tanks and 50c in drums. 20° Cold Test neatsfoot oil was firm at 17c with stocks short, but the other grades were lower in price. Extra neatsfoot was quoted at 10¾c; No. 1 neatsfoot, 10c. Business on sulfonated oils is more or less routine with prices unchanged; 6½c for pure sulfonated cod, 6c with 25% mineral added, and 5¾c for 50% mineral. Waterless Moellon was quoted 7½c; Moellon containing 25% moisture, 6¾c; commercial sulfonated neatsfoot, 10½ to 10¾c. Sulfonated castor oil, 11½c for 75% and 9c for 50%.

Market for raw tanning materials was very dull with few trades to report. Prices were steady, with Divi-Divi quoted at $34.00; Myrobalan, $23.50 for J-1 and $14.75 for J-2; Mangrove Bark, $27.00; Wattle Bark, $29.75; Valonia Beards, $60.00; Cups, $47.00. Ground Sicily Sumac, $55.00; Leaf, $61.00.

Tanning extracts shipments are holding up very well, although prices are unchanged. The market closed firm. Quebracho Extract, solid ordinary, 3⅝c; clarified, 3⅞c. Liquid Quebracho was unchanged at 2⅝c in tanks and 3⅛c in bbls. Liquid Chestnut was firm at 1½c in tanks. Solid Cutch was quoted at 4c; Oak Bark, liquid, 2¾c; Hemlock, 2½c, tank basis. Solid Myrobalan extract was firm, 4⅛c; Solid Wattle Bark, 3⅝c; Plantation Gambier, 8¼ to 8⅜c f.o.b. N. Y. City. Spruce extract, regular, was posted at 1c; Super Spruce, 1⅜c in tanks.

Du Pont Asks Injunction

Du Pont Rayon is asking an injunction to halt construction of the Richmond Industries, Inc., dye plant in Richmond, Va. Plaintiff sets forth in its bill that "irreparable harm and injury" will be done to the du Pont plant at Ampthill if the dye plant, known as the Richmond Piece Dye Works, is permitted to operate.

Petition for a restraining order recites that the du Pont concern has invested more than $15,000,000 in plants in Ches-

terfield County for the manufacture of Cellophane and rayon and the value of the yearly output of the firm is $14,000,000. About 6,700,000 gals. of filtered water must be used daily, it is set forth. Product is largely undyed yarn. Any discoloration of this yarn or lack of uniformity in its natural color will impair its value. Petitioners allege that the Richmond Piece Dye Works is preparing to engage in dyeing materials, chiefly rayon, and that sewage from such a plant will pollute the water necessary for the du Pont industry and ruin its product.

Odds and Ends of the News

Providence Drystalters, old New England manufacturer of chemical textile specialties, passes into the hands of Paper Makers Chemical, a Hercules Powder subsidiary.

French oak tanning extract industry, keenly feeling the competition of quebracho, is reported organizing other European producers in a possible cartel movement.

Twenty-four colors, including 18 new and 6 repeated shades, have been selected for the coming Fall and Winter seasons by the Glove Color Committee of the Textile Color Card Association.

The Fiory Dye Works has purchased the printing plant in Paterson which was formerly occupied by the Synthetic Dyeing & Printing Co. Fiory will operate this plant under the name of Artcraft Dyeing & Printing.

Weather Blamed for Lag in Paint Production

Raw Paint Material Suppliers Expect Heavy March Tonnages—'35 Paint Sales Satisfactory—Building Outlook is Bright—Lead Pigments Advanced—

Severe winter weather with many of the lines of transportation crippled is held responsible for the delay by paint makers in starting spring manufacturing operations on a broader scale. This condition is likely to lead, however, to a rush for deliveries during March that will tax paint raw material factors, for all view the '36 spring paint season with great enthusiasm and look for higher sales totals than were reached in the satisfactory '35 2nd quarter.

Lead had a rise for the 1st time since October and the carlot quotations on red lead and litharge were advanced. Zinc quotations were also stronger but no changes in the zinc pigment prices were made.

Important Price Changes

ADVANCED

	Feb. 29	Jan. 31
Lead, red 95%	$0.0735	$0.07
97%	.0760	.07¼
98%	.0810	.07½
Litharge	.0610	.06

DECLINED

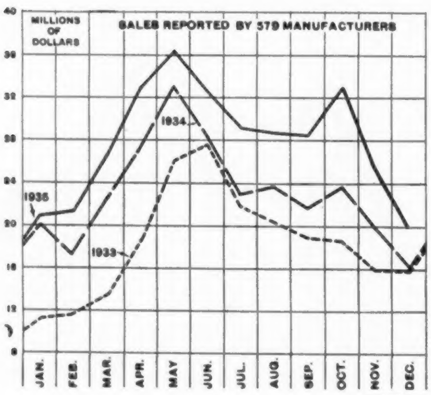
Casein, 20-30 mesh	$0.14½	$0.15
80 mesh	.15	.15½

DEPT. OF LABOR STATISTICS

	Jan.'36	Dec.'35	Jan.'35
Employment a	107.1	z107.9	98.7
Payrolls a	91.8	z93.7	79.4

	Jan. '36	Jan. '35
Pigments, Paints and Varnish, exports	$1,265,000	$1,063,000

a 1923-1925=100.0; z Revised.



Paint sales in '35 were in good volume.

Final paint, varnish and lacquer sales figures for '35, as released by the Bureau of the Census, reveal that the totals for 579 plants reached $334,277,609, as compared with $276,206,117 in '34 and $220,303,893 in '33. Breakdown of the '35 sales figures show industrial sales of paint, varnish and lacquer amounted to $99,035,951, as compared with $77,614,508 in '34 and $60,140,098 in '33; and paint and varnish sales at $70,099,360 for '35 as compared with $54,515,824 in '34 and $43,431,788 in '33. Lacquer sales in '35 totalled $28,936,591, as compared with $23,098,684 in '34 and $16,708,310 in '33. The '35 figure for trade sales of paint, varnish and lacquer was $130,355,319, as compared with $108,506,469 in '34 and $91,572,769 in '33.

Construction continues in excess of the level of last year. For January a total of $204,792,800 was reported by F. W. Dodge Corp. for construction undertakings of all types in 37 states east of the Rockies. This compares with only $99,773,900 for January, '35, but represented a decline of about 22% from the $264,136,500 reported during December, '35.

New residential construction may show a much sharper rise during March than had been expected earlier in building circles. This would reflect chiefly postponement of much building in January and February on account of the extremely cold weather. Builders ordinarily initiate a large proportion of their new projects for the year during January and February, to have them ready for the fall renting season. This year they have had to wait in many cases for more moderate weather. This increase would coincide with the spring upturn in building by individual home owners, which usually gets under way in March.

Devoe Raises Dividends

Devoe & Raynolds Co. has placed A and B common stocks on a regular $2 annual basis, with a quarterly declaration of 50c. This is the same amount as was paid each quarter since the beginning of '34, when payments were resumed. However, heretofore, the dividends were designated as 25c "regular" and 25c extra. Stockholders voted to retire the 1st preferred stock at $115 a share, plus accrued dividends to Apr. 1, in amount $1.75.

Petroleum Solvents Advanced ½¢ in the East

East Coast Refineries "Boost" Tankcar and Tankwagon Quotations Feb. 1—Demand for Solvents Declined in February—Automotive Production at Low Point—

The much talked of price rise in petroleum solvents at East Coast refinery points was finally placed in effect as of Feb. 1st, and amounted to ½c on the tankcar quotations. This action brings current quotations in the East more in line with Group 3 prices which were adjusted upwards in January. Tankwagon quotations were raised in several eastern cities, including New York, Philadelphia and Trenton.

Demand for all solvents declined somewhat in February. Both the automotive and rubber industries operated with schedules curtailed from January levels. This situation is regarded as being but temporary and a much better volume in March is anticipated.

Production of industrial alcohol during January amounted to 13,178,706 proof gals., while tax-paid withdrawals from bonded warehouses totaled 1,840,392 gals. An amount of 10,432,704 gals. was re-

Important Price Changes

ADVANCED

	Feb. 29	Jan. 31
Petroleum thinner, East, tks.	$0.09½	$0.09
Rubber solvent, East, tks.	.09½	.09
Stoddard Solvent, East, tks.	.09½	.09
Cleaners' Naphtha, East, tks.	.09½	.09

DEPT. OF LABOR STATISTICS

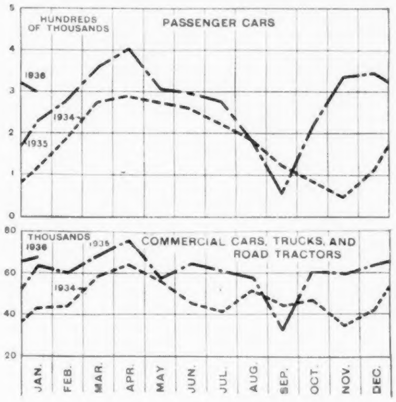
	Jan.'36	Dec.'35	Jan.'35
Petroleum Refining:			
Employment a	108.2	z109.6	109.6
Payrolls a	99.3	z104.0	95.2

	Jan. '36	Jan. '35
Petroleum & Products:		
Exports	$20,125,000	$17,637,000
Imports	2,772,000	2,132,000

a 1923-1925=100.0; z Revised.

moved for denaturization and 19,385,601 gals. remained in the warehouse at the end of the month. Sale of anti-freeze alcohol was helped considerably by the cold snap which spread over most of the country. If the vagaries of the weather should bring a March with warm and cold snaps alternately with some rapidity, the volume for the season will come close to reaching the best hopes of the producers themselves.

March automotive production is expected to cross the 400,000 mark. This would compare with the 300,000 unit total for February and 451,000 in March of last year. It is unlikely that current production will better last year's figures for at that time manufacturers were struggling to build up dealers' stocks whereas the earlier introduction of models this season permitted producers to gain an earlier start on full-scale production. Total for the 1st 2 months of '36 is around 680,000 units, comparing with about 656,000 for the like period of '35. Cold weather hurt February sales, and the total, 225,000, is slightly under the 240,000 total of January. But if the weather did prove a handicap last month it merely postponed sales and the rest of the spring months should see even greater sales volume than was predicted at the turn of the year. Several factories in the Detroit area last month operated on a 3 or 4 day week basis, some plants were closed for a week or more, but in the 1st week in March practically all returned to a 4-day week schedule and by the end of the month the industry is expected to be pretty uniformly on a 5-day-week basis.



Car production set the recovery pace in '35.

Another Alcohol Plant?

The Sun-Maid Raisin Growers of California may convert their syrup plant at Fresno into the production of industrial alcohol, according to Pacific Coast reports.

George P. Halliwell is appointed research director for H. Kramer & Co., Chicago, non-ferrous scrap refiners and producers of brass ingots. Mr. Halliwell was formerly a Carnegie Tech professor of metallurgy.

Cottonseed Oil Prices Decline in Light Trading

January Consumption Figures are Disappointing—Linseed Markets Almost at Standstill in February—Chinawood Quotations Rise—Last Quarter Oil Statistics Released—

Cottonseed oil prices lost ground last month. Part of the bearish attitude was due to the disappointing January consumption figures of only 185,596 bbls. when the trade anticipated over 200,000. Comparison of closing prices on Feb. 29th and Jan. 31st is given:

	Feb. 29th	Jan. 31st
Mar.	9.35*	10.10 10.12
Apr.	9.40†	10.00
May	9.53-9.56	10.12
June	9.55†	10.00
July	9.56‡	10.11-10.12
Aug.	9.40†	9.95-10.10
Sept.	9.45-9.48	9.93
Oct.	9.15-9.18	......
Crude:		
Southeast	8.25*	9.00†
Valley	8.25*	9.00‡
Texas	8.12½	8.87½†

* Bid; † Nominal; ‡ Sales.

February was one of the most disappointing months in several years to the linseed oil producers and prices slumped off as a result. Paint operations have been seriously delayed by the severity and extent of the protracted cold spell, but a sharp pick-up from the February low should occur in March when building and modernization operations again become more active. Chinawood prices again turned upward late in February with several reasons being advanced, the most plausible one being that considerable speculation was going on at the primary market.

Forecasts of new taxation of vegetable oils and fats have exercised a disturbing influence upon the markets for these products during the past few weeks. A processing tax on hogs, and consequently on lard, generally is expected, while many report that the revenue bill of 1936 will contain excise taxes on various edible and paint oils. Further, since the 3c processing tax on coconut oil currently is being challenged in the courts as to its constitutionality, some alteration of that levy also is in prospect.

During the past year consumption and imports of perilla oil were approximately 3 times the volume prevailing in the preceding year. Further, imports of such oils as hempseed also increased in volume. Accordingly, rumors are prevalent that probably a 3c or even a 5c tax on these oils may be levied, particularly if a processing tax is imposed on flaxseed. At present linseed oil is subject to a tariff of 4½c per pound, hempseed oil of 1½c, while perilla oil enters duty free.

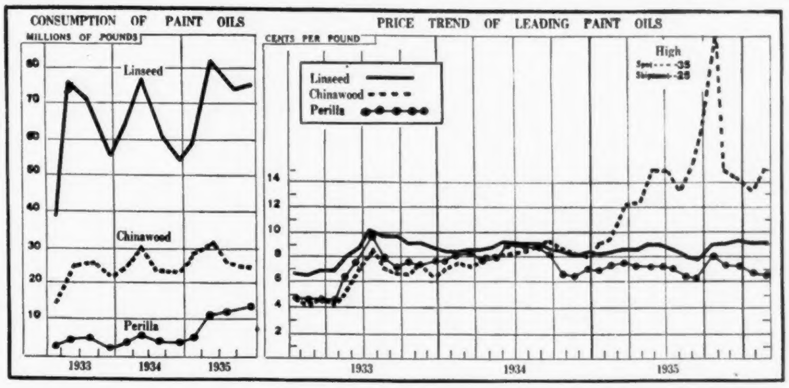
Perilla oil prices have been low during the past few weeks and a major reason advanced for this development is the fear of taxation at this session of Congress. But in the last week of February when Chinawood went up, the paint companies again came into the market for perilla in large quantities.

Larger Wood Oil Crop

The '35 Chinawood oil crop is estimated 10 to 15% above that of '34, according to a radiogram to the Bureau of Agricultural Economics from Agricultural Commissioner O. L. Dawson in China. Arrivals of new crop oil at Chinese markets have been heavier than normal as a result of active demand and high prices.

Chinese wood oil exports during the '35-'36 crop year are expected to be 10% above those for '34-'35 when they amounted to 147,467,000 lbs. compared with 154,800,000 in '33-'34. Exports to the U. S. last season amounted to 99,070,000 lbs. compared with 101,733,000 the previous year.

Shipments of China tung oil from Hankow to the U. S. amounted to 16,732,000 lbs. in January, bringing the total for the past 2 months to 36,400,000 lbs., or about 30% the total amount of this oil imported into the U. S. during the whole of '35. In addition, between 2 and 3 million lbs. of South China tung oil were



Courtesy, N. Y. Journal of Commerce.

Rise in consumption of perilla oil last year in the paint field and the corresponding decline in the use of chinawood is explained by the price trends in the 2 oils.

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shipped to the American market during December and January by way of Hongkong.

The '35 crop of sesame seed in China was slightly smaller than that for the preceding season and the quantity available for export will be correspondingly reduced, according to a radiogram received by the Bureau of Agricultural Economics from Agricultural Commissioner O. L. Dawson in Shanghai.

Final Quarter Statistics

Bureau of the Census announces that the factory production of fats and oils, exclusive of refined oils and derivatives, during the three-month period ended Dec. 31, '35, was as follows: Vegetable oils, 950,783,967 lbs.; fish oils, 108,078,048 lbs.; animal fats, 319,916,272 lbs. and greases, 68,941,805 lbs.—a total of 1,447,702,092 lbs. Of the several kinds of fats and oils covered by this inquiry, largest production, 572,478,390 lbs., appears for cottonseed oil. Next in order is lard with 186,878,762 lbs.; linseed oil, 156,568,904 lbs.; tallow, 131,251,660 lbs.; coconut oil, 84,509,030 lbs.; soya bean oil, 43,712,220 lbs.; corn oil, 29,531,242 lbs.; peanut oil, 28,762,408 lbs.; castor oil, 13,918,450 lbs.; hempseed oil, 6,410,336 lbs., and sesame oil with 5,659,908 lbs.

Naphthalene Shortage Continues Unchanged

Reasons for Tight Situation in Crude Analyzed—January Coking Operations Close to December Total—Cresylic Acid Market is Firm—Coal Tar Solvents Scarce—

The naphthalene shortage, reported in the February issue, remains unchanged, with quotations on crude nominal. Germany, facing a serious shortage, has shut down on all shipments of crude, but refined may still be exported under certain circumstances, subject to specific official authorization in each instance.

In former years Germany produced more naphthalene than could be consumed in the domestic market and considerable quantities were exported, particularly to the U. S. which took from one-half to two-thirds of the total amount exported.

During the 1st 11 months of '35 a total of 4,934 metric tons of naphthalene were shipped from Germany to the U. S. compared with 8,942 tons for the corresponding period of '34, official German statistics show.

Consumption of naphthalene has likewise increased rapidly in the U. S. during recent years. During '34, the last year for which figures are available, over 38,000,000 lbs. of refined naphthalene were produced in the U. S. and 48,000,000 lbs. of the crude were imported, 22,000,000 of which came from Germany, 7,300,000 from Belgium, 7,000,000 from the United Kingdom, 5,765,000 from Poland and Danzig, and the balance from Czechoslovakia, the Netherlands, Russia, and Canada. Imports of crude naphthalene into the U. S. during '35 showed little change either in quantity or value from the preceding year, according to preliminary statistics.

The statistical picture of cresylic is one of great strength. Import factors again raised quotations last month and some reselling by contract consumers who have drawn heavily on their requirements is reported. Large purchases of imported material were subject to cable confirmation.

Despite the slight decline in operations in the automotive and tire industries the scarcity of spot stocks of xylol, toluol and solvent naphtha continues. Benzol demand was only fair last month with industrial grade showing a slight gain in volume of shipments.

January Coking Operations

Activity in the coke industry during January was substantially at the same level as in December. Total output of both byproduct and beehive coke amounted to 3,450,342 tons, or 111,978 tons per working day, a decrease of 1.3% in comparison with the daily rate prevailing in December. This is the 1st halt in the steady upward trend of output since July, '35.

Production of byproduct coke for January amounted to 3,308,742 tons or 106,734 tons per day. Compared with December, rate declined 1.8%, practically all of which occurred at furnace plants, where the average per working day was 2.5% less than that of the preceding month. At merchant plants the rate declined only 0.2%. Daily rate of pig iron production during the same period fell off 3.8%.

Production of beehive coke for the month rose from 4,828 tons per day in December to 5,244 tons in January, a gain of 8.6%.

Stock piles at byproduct plants decreased 24.1%, from 2,779,509 tons to 2,110,216 tons, lowest level reached since June, '34. Bulk of the decrease occurred at merchant plants, where stocks were depleted by 28.0%.

January benzol production totalled 7,825,000 gal., a 3.2% decline from the December figure. January '35 production totalled only 6,182,000 gal.

Weather Delays Fertilizer Mixers

Nitrate and Sulfate Quoted $1 a Ton Higher—Firmer Mixed Fertilizer Prices Likely—January Tag Sales Up 6%—Superphosphate Production Declines—Foreign Trade at High Point

The South has experienced the most severe winter in years and the ground is totally unfit for working. As a result the period for fertilizer application will come much later than usual and mixers have delayed their operations. The market for raw fertilizer materials, in the doldrums for the best part of the month of February, was suddenly treated to sudden and unexpected price increases in both sulfate of ammonia and nitrate of soda in the closing days of the month, the advance 1st being made in sulfate and followed a day later by the nitrate. An increase in nitrogen solution was also placed in effect but no changes in quotations were posted for cyanamid or urea-ammonia liquor. A large increase in exports of sulfate is held responsible for the tight position which has been slowly developing and which, some market factors say, will reach an acute stage late in the spring.

One very decided effect the sudden increases in sulfate and nitrate are likely to have is a cessation of the shading of mixed fertilizer prices. It is thought unlikely, however, that the $1 a ton increase in both raw materials will cause mixed fertilizer prices to be raised, for most of the large and medium sized mixers are covered at the lower figures and also feel that an increase at this time might cause the farmer to curtail purchases on a sizable scale. "Leave well enough alone," seems to be the governing motto.

Important Price Changes

ADVANCED	Feb. 29	Jan. 31
Ammonium sulfate	$23.00	$22.00
Blood, dried, N. Y.	3.20	3.10
Nitrogen solution, 45½%	1.00	.96
Sodium nitrate, bulk	24.50	23.50
100 lb. bgs.	26.50	25.50
200 lb. bgs.	25.80	24.80
Tankage, grd., N. Y.	3.10	2.85
Ungrd.	2.75	2.60
DECLINED		
Blood, Chgo.	$3.25	$3.50
Tankage, Chgo.	2.65	2.75
Imp.	3.10	3.15

DEPT. OF LABOR STATISTICS	Jan. '36	Jan. '35
Fertilizers & Materials:		
Exports	$2,034,000	$ 664,000
Imports	2,806,000	2,989,000

Effect of Cold Weather

Cold weather and rain have delayed early season farm work throughout the cotton belt except possibly in the southern third of Texas. But there is, of course, yet time to get land prepared by the usual planting dates. A report from the American Cotton Crop Service states that these factors, along with the perplexity caused by the invalidation of AAA, have served to retard all farming operations in the cotton belt. Most of their crop reporters think the cotton acreage will be held under the 35,000,000 figure.

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COMING TRENDS IN BUILDING CONSTRUCTION PREDICTED BY BROOKMIRE

The February issue of the Analyst contains much interesting and informative material regarding the future probabilities of building construction and affiliated industries.

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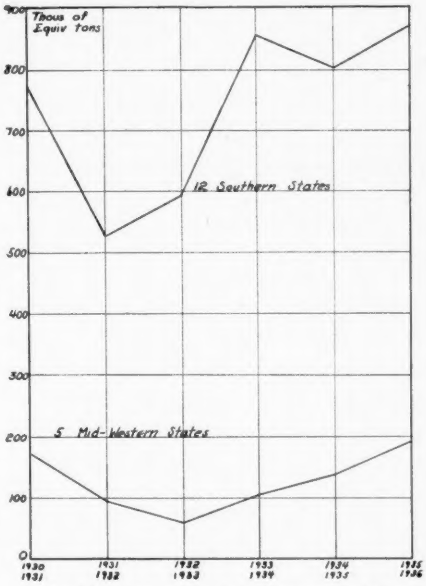
Fertilizer tag sales in 12 southern states during January totaled 341,793 tons representing a gain of 6% over January, '35. Six of the reporting states registered



Fertilizer tag sales, July-January period, graphically shown.

increases over last year with the most important rise taking place in Georgia. Declines occurred in 6 states. In the past 5 years January accounted on the average for 8 1/10% of the year's sales.

Fertilizer Personnel

H. M. Laird is appointed V.-C. northern sales manager and J. A. Howell is the new southern sales manager.

Charles J. Cottee, I. A. C. secretary and treasurer, retires because of ill health after more than a quarter of a century of service. J. H. Hunt, former traffic manager, is the new secretary and R. P. Resch, former comptroller, the new treasurer. Carl F. Husen is now assistant comptroller.

Superphosphate Down 14%

Superphosphate production declined considerably from December to January. Output in January was 14% under January, '35, with both geographical areas reporting about the same decline. In the 1st 7 months of the current fiscal year, from July through January, total production was 7% larger than in the corresponding period of the preceding year. Shipments to mixers were at an unusually high level in January, much larger than in the corresponding month of recent years. Shipments to other acidulators were somewhat larger than in January of last year but shipments to consumers and in base and mixed goods registered declines. For the July-January period all classes of shipments showed increases over last year but the gains were moderate in shipments to consumers and in base and mixed goods. Total stocks at the end of January were 3.6% larger than they had been a year earlier. A slight decline, however, was shown in stocks of bulk superphosphate.

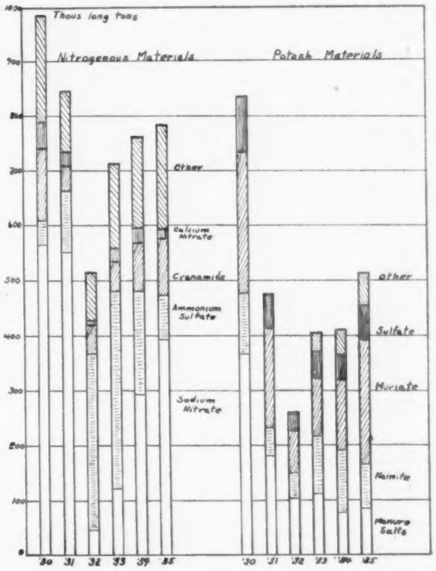
Foreign Trade Sets Record

Foreign trade in fertilizers and fertilizer materials was larger in December, '35, than in any corresponding month in many years, according to a report by The N.F.A. and based on data compiled by the Dept. of Commerce. Increases were quite general in both the export and import classifications. As compared with December, '34, exports increased 8% in tonnage and 17% in value; gains of 56% in volume and 72% in value were registered by total imports.

Total exports for '35 are placed at 1,484,081 tons, with a value of $14,809,035. With the exception of '29 and '30, volume last year was the largest on record. Tonnage of exports, for the 2nd consecutive year, exceeded imports but the value was much less. Increases over the preceding year were most pronounced in ammonium sulfate, phosphate rock, and potash fertilizers. Potash exports reached a new high total amounting to 67,842 tons during the year, valued at $1,992,062, with Japan being the principal importing country. Approximately one-half of the value of export shipments in '35 was accounted for by potassic and nitrogenous fertilizers and fertilizer materials.

Imports rose to the highest level recorded in 4 years, amounting to 1,405,111 tons with the total valuation placed at $29,417,844. The greatest increase took place in potash materials, which rose to the highest point reached since '30. Trend of imports of low grade salts continued downward in '35 but sharp increases occurred in importations of muriate and sulfate. Rise in imports of nitrogenous materials was largely the result of an increase in sodium nitrate; the principal other change in this group was a drop of more than 50% in ammonium sulfate.

Value of fertilizer exports has been increasing somewhat more rapidly than has the value of all exports. The ratio of fertilizer exports to total exports in '35 rose to the highest point reached in at least 15 years. Fertilizer imports have

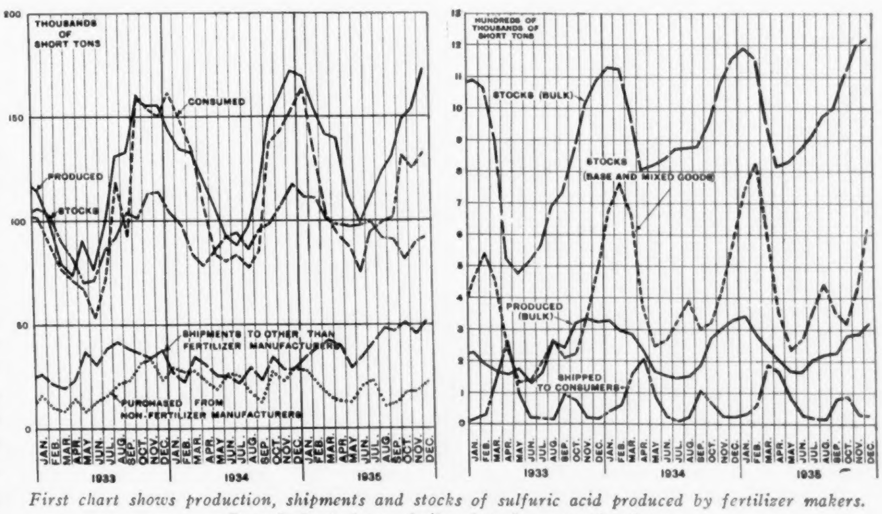


Imports of fertilizer materials, calendar years, 1930-'35.

been rising more slowly than has the total figure for all imports since the recovery began in '33.

TVA is Constitutional

TVA, or at least certain aspects of it that were before the U. S. Supreme Court, have been declared constitutional by an 8 to one decision. Fertilizer manufacturers directly and indeed all chemical manufacturers are keenly interested as to the ultimate effect this decision and possible other ones in the future on TVA will have on the fertilizer and industrial chemical industries. According to a survey made by the N. Y. *Journal of Commerce*, fertilizer manufacturers see little possibility of Federal competition in this field. The opinion is frequently expressed that TVA officials in charge of fertilizer manufacture and distribution are little inclined to go into the fertilizer industry in competition with private industry.



First chart shows production, shipments and stocks of sulfuric acid produced by fertilizer makers. Second chart shows similar data for superphosphate.

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Crotonaldehyde
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Aluminum Formate
Sucrose Octa Acetate
Other Acetate Salts

SPECIFICATIONS

Aluminum Acetate	19.5% to 20.8%
Al_2O_3	4.9% to 5.2%
Free Acid	½% maximum
pH	3.3 minimum
Chlorides	Negligible
Sulphates	Negligible
Color	Water white to pale yellow
Sp. G.	1.087 to 1.093 @ 20°C.
Weight	9.1 lbs. per gal. @ 20°C.

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Non-returnable	Net Weight
10 gal. Kegs	90 lbs.
50 gal. Barrels	450 lbs.

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In dyeworks it functions as a mordant for cotton dyes, and as a base for color lakes, and finds further application in printing fabrics.

Basic Aluminum Acetate powder and a 30% Aluminum Formate Solution are also available. Samples of these products and quotations on your requirements furnished on request.

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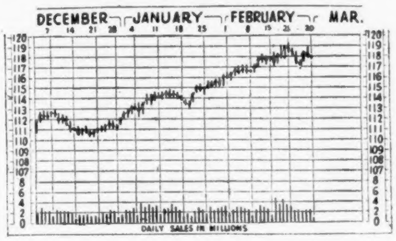
Chemical Stocks Gain $58,869,631 in February

Stock Market is Close to a Year of Steady Enhancement in Values — Greater Interest Displayed in Allied — Mathieson Alkali Reports Highest Earnings Since '31—United Carbon's Net Sets All-Time Record—Other Financial News—

Stock prices again advanced in February, the 11th consecutive month of higher levels. Trading was slightly less active than in January, but it was the largest for a February since 1931. The advance in February was very irregular and the market reached a new high on Feb. 19th.

The market value of stocks listed on the New York Stock Exchange advanced



—N. Y. Herald-Tribune.

Current stock rise will be a year old March 19th if—

$1,037,090,850 during February, according to figures issued March 5 by the Exchange. On Mar. 1st there were listed 1,192 stock issues aggregating 1,322,819,505 shares having a total market value of $51,201,637,902. This compares with 1,191 issues, or 1,320,759,574 shares, on Feb. 1, with a market value of $50,164,547,052. The average price rose from $37.98 to $38.71 a share.

The chemical group has registered impressive gains in the 1st 2 months of the year. Value of the chemical group on Mar. 1 totalled $5,363,814,662, as compared with $5,078,983,705 on Jan. 1, a net gain of $284,830,857. In the same period the average price rose from $68.10 to $72.28, a net gain of $4.18. The gain registered in February, however, was much smaller than that made in January. Value of the chemical group on Feb. 1 totalled $5,304,945,031 and the average price was $71.09. The net gain in January amounted to $225,961,326 and only $58,869,631 in February, while the average price rose $2.99 in January and but $1.19 in February.

Practically all of the leading chemical common stocks registered increases in February, the noteworthy exceptions being Air Reduction with a 6 point loss, Columbian Carbon with a loss of 5⅝ points and duPont off 2⅜ points. Many new highs were made last month in the chemical group and even the alcohol stocks began to show signs of strength. Interest in Allied is again increasing, many of the Wall st. houses pointing out that the relation of earnings to the price of the stock is out of line with the average and attractive at present levels, particularly so in view of the recent development on the preferred.

A great deal of the purchasing in common stocks is undoubtedly for cash and as a hedge against possible inflation. Chemical stocks generally are looked upon favorably as a hedge. This plus the fact that the rate of operations in the chemical field generally over the past year has been quite satisfactory and the future outlook promising has focused the attention of the investing public on the chemical stocks.

Mathieson Nets $1.44 a Share

Mathieson Alkali earnings last year were the largest since '31, reflecting increased activity in viscose rayon production, oil refining, soap and glass making and other industries which use Mathieson's products.

Net income was $1,359,776, or $1.44 a share, after preferred dividends on 830,663 shares of common, against $1,165,836, or $1.20 a share in '34. While net income did not quite cover the $1.50 annual dividends paid last year on the common, disbursements were covered by a wide margin if depreciation reserves are taken into account.

Westvaco Has $618,343 Profit

Report of Westvaco Chlorine and subsidiaries for year ended Dec. 28, '35, certified by independent auditors, shows net profit of $618,343 after depreciation, interest, federal taxes, etc., equivalent, after 7% preferred dividend requirements, to $1.63 a share on 284,962 no-par shares of common stock. This compares with $595,997 or $1.55 a share on common in year ended Dec. 29, '34.

United Carbon Sets Record

United Carbon's '35 earnings were the largest in the history of the company. Net profit after depreciation, depletion, provision for Federal taxes and con-

Dividends and Dates

Name	*Div.*	*Stock Record*	*Payable*
Abbott Lab., extra	10c	Mar. 18	Apr. 1
Abbott Lab.	75c	Mar. 18	Apr. 1
Amer. Smelt. & Rfg.	**40c**	**Jan. 31**	**Feb. 28**
Archer-Daniels-Midland, special.	25c	Feb. 19	Mar. 1
Archer-Daniels-Midland	25c	Feb. 19	Mar. 1
Armour & Co. (Del.), 7% pf...	$1.75	Mar. 10	Apr. 1
Atlas Powder, extra	25c	Feb. 28	Mar. 10
Atlas Powder	50c	Feb. 28	Mar. 10
Bon Ami, Cl. B ..	50c	Mar. 10	Apr. 1
Celluloid Corp., 1st pf.	$2.00	Jan. 31	Feb. 20
Ch ckasha Cotton Oil, special	50c	Mar. 9	Apr. 1
Climax Molybdenum	20c	Mar. 14	Mar. 31
Clorox Chem.	50c	Mar. 20	Apr. 1
Clorox Chem., extra	12½c	Mar. 20	Apr. 1
Colgate-Palmolive-Peet	12½c	Feb. 6	Mar. 1
Colgate-Palmolive-Peet, pf.	$1.50	Mar. 5	Apr. 1
Columbian Carbon.	$1.00	Feb. 14	Mar. 2
Devoe & Raynolds, A	50c	Mar. 20	Apr. 1
Devoe & Raynolds, B	50c	Mar. 20	Apr. 1
Devoe & Raynolds, 2nd pf.	$1.75	Mar. 20	Apr. 1
du Pont	90c	Feb. 26	Mar. 14
du Pont, deb.	$1.50	Apr. 10	Apr. 25
Eastman Kodak, extra	25c	Mar. 5	Apr. 1
Eastman Kodak ...	$1.25	Mar. 5	Apr. 1
Eastman Kodak, pf.	$1.50	Mar. 5	Apr. 1
Ferro Enamel	20c	Mar. 10	Mar. 20
Freeport Texas ...	**25c**	**Feb. 14**	**Mar. 2**
Freeport Texas, pf.	**$1.50**	**Apr. 15**	**May 1**
Gen. Paint, Cl. A .	50c	Mar. 10	Apr. 1
Gen. Print. Ink ..	50c	Mar. 18	Apr. 1
Gen. Print. Ink, pf.	$1.50	Mar. 18	Apr. 1
Glidden	50c	Mar. 18	Apr. 1
Glidden, pf.	$1.75	Mar. 18	Apr. 1
Hercules Powder..	75c	Mar. 13	Mar. 25
Heyden Chem. ...	25c	Feb. 25	Mar. 2
Int'l Salt	37½c	Mar. 16	Apr. 1
Int'l Nickel	25c	Mar. 2	Mar. 31
Koppers Gas & Coke, 6% pf. ..	$1.50	Mar. 12	Apr. 1
Lindsay Light & Chem., pf.	17½c	Mar. 7	Mar. 16
Mathieson Alkali..	37½c	Mar. 4	Mar. 31
Mathieson Alkali, pf.	$1.75	Mar. 4	Mar. 31
Monsanto Chem., extra	25c	Feb. 25	Mar. 14
Monsanto Chem. ..	25c	Feb. 25	Mar. 14
Monroe Chem., pf.	87½c	Mar. 14	Apr. 1
Nat'l Lead	$1.25	Mar. 13	Mar. 31
Nat'l Lead, pf. B..	$1.50	Apr. 17	May 1
Nat'l Lead, pf. A..	$1.75	Feb. 28	Mar. 14
Paraffine Cos.	50c	Mar. 10	Mar. 27
Patterson-Sargent .	25c	Feb. 15	Mar. 1
Penick & Ford ..	75c	Mar. 2	Mar. 16
P. & G., 5% pf. ..	$1.25	Feb. 25	Mar. 14
Rainier Pulp & Paper, Cl. A ...	50c	Feb. 15	Mar. 1
Rainier Pulp & Paper, Cl. B ..	50c	Feb. 15	Mar. 1
St. Joseph Lead ..	10c	Mar. 5	Mar. 20
Sherwin-Williams, pf.	$1.50	Feb. 15	Mar. 2
Sherwin-Williams, Ltd., pf.	$1.75	Mar. 15	Apr. 1
Spencer Kellogg ..	40c	Mar. 14	Mar. 31
Texas Gulf S.	50c	Mar. 2	Mar. 16
Tubize-Chatillon, 7% pf.	$1.75	Mar. 10	Apr. 1
Union Carbide ...	50c	Mar. 6	Apr. 1
U. S. I.	50c	Mar. 16	Apr. 1
Westvaco Chlorine, pf.	$1.75	Mar. 16	Apr. 1
Westvaco Chorine.	10c	Feb. 15	Mar. 2

Price Trend of Chemical Company Stocks

	Jan. 31	Feb. 7	Feb. 14	Feb. 21	Feb. 29	Net gain or loss last month	Price on Feb. 28, 1935	1936-35 High	1936-35 Low
Air Reduction	189	192	190¾	185	183†	— 6	112	194	104⅜
Allied Chemical	165	162	167	165¼	172½	+ 7½	134	176*	125
Columbian Carbon	107⅝	106½	104½	104	102	— 5⅝	74¾	109*	67
Com. Solvents	20¾	20½	21⅛	24⅜	23⅜	+ 2⅝	20⅞	24⅝*	16½
du Pont	146¼	146	148	149	143⅞	— 2⅜	92¾	150¼*	86⅝
Hercules Powder	87⅝	88⅝	100	103½	101†	+13⅜	75	105½*	71
Mathieson	31¼	32½	32⅞	35¾	34¼	+ 3	27	36½*	23¾
Monsanto	95½	93½	95½	95	97†	+ 1½	58⅝	98*	55
Std. of N. J.	59⅝	59	59⅝	61	59⅞	+ ¼	38	61¾*	35¾
Texas Gulf S.	37¼	38	38	38¼	37½	+ ¼	33¼	38¾*	28¾
Union Carbide	76	76¾	81⅞	85	82¾	+ 6¾	46⅞	87*	44
U. S. I.	41¼	40⅝	40⅜	42⅞	42⅛	+ ⅞	40	50⅝	35⅛

* New highs for Feb. † Feb. 28.

tingencies was $1,872,405, which was equal to $4.70 a share on 397,885 shares of no-par common. In the preceding year net profit, after similar deductions, was $1,452,939, equivalent to $3.55 a share.

Profit for last year was after charging out $278,900 for estimated Federal taxes and State income taxes, $185,000 for contingencies and $1,079,971 for depreciation and depletion.

N. J. Zinc Reports '35 Increase

Net income of New Jersey Zinc for '35 amounted to $4,666,000 after taxes, depreciation, depletion, contingencies and other charges, equal to $2.37 a share on 1,963,264 shares of $25-par capital stock. Year before company earned $3,788,380, or $1.93 a share. For the final quarter of last year net income was $1,323,784 after similar deductions, equal to 67c a share. This compared with $1,168,003, or 59c, earned in the preceding quarter and $955,231, or 49c a share, in the December quarter of '34.

United Chemical's Loss, $49,596

United Chemicals, and subsidiaries, report for year ended Dec. 31, '35, net loss of $49,596 after taxes, depreciation, etc., comparing with net loss of $82,131 in '34. Net loss for quarter ended Dec. 31, '35, was $11,444 after taxes and charges, against net loss of $15,346 in December quarter of preceding year. Current assets as of Dec. 31, '35, including $316,086 cash and government securities, amounted to $1,371,979 and current liabilities were $77,679 compared with cash and government securities of $263,673, current assets of $1,212,811 and current liabilities of $85,114 at end of preceding year.

V.-C. May Retire 7% Prior Pfd.

V.-C. directors are considering plans for retiring either all or part of the remaining outstanding 7% prior preference stock valued at $5,437,200, A. Lynn Ivey, president, reports.

At a meeting of directors the board discussed the retirement of the stock, Mr. Ivey said, and the plan probably will be the most important consideration at the next board meeting, Mar. 20, which will be held in N. Y. City.

If the entire stock is retired, Mr. Ivey said, the corporation probably will obtain a bank loan of about $2,500,000, which, together with surplus funds in the company's treasury, would be used to retire the outstanding 7% stock at 110 plus accrued dividends.

He said the company already holds in its treasury 90,499 shares of prior preferred stock. Bank loans will mature serially over a period of 5 years. Mr. Ivey stated it was difficult to determine how soon the board would act regarding retirement, adding that he was not certain whether all or just part of the stock would be retired, if any.

National Lead Votes on Split

National Lead stockholders will vote Apr. 16th on a plan to split the common shares 10 for one, reducing the par value from $100 to $10, and to exchange 10 new shares for each old one. A two-thirds vote of each class of stock will be necessary to ratify the plan. The company's report for '35, shows a net profit of $5,261,390 after Federal taxes, depreciation, depletion and other charges, equal, after preferred dividend payments, to $10.78 a share on the 309,831 shares of common outstanding. This compares with $4,200,188, or $8.37 a share, on 271,500 common shares in '34.

Probable Carbide Earnings

Carbide will probably report over $1 a share earned in the final quarter of last year, according to *The Wall St. Journal.* This is the best quarter the company has had since the boom days of '29.

On this basis earnings for the full year may be estimated at slightly more than $2.90 a share for the 8,093,138 shares of capital stock outstanding. In the 1st 9 months of last year net was $16,780,882 or $1.88 a share; in the full year '34, $2.28 a share and in '33, $1.59 a share.

Extra Dividends Declared

Pittsburgh Plate Glass directors, voted Mar. 4th, a special disbursement of $1 in addition to the regular quarterly dividend of 50c.

Atlas Powder has declared a 25c extra, 1st paid since December of '30.

Earnings Statements Summarized

Company:	Annual dividends	Net income 1935	Net income 1934	Common share earnings 1935	Common share earnings 1934	Surplus after dividends 1935	Surplus after dividends 1934
Abbott Laboratories:							
Year, December 31	§$3.00	$1,135,501	$896,959	*h*$5.67	*h*$6.18	......	......
Archer-Daniels-Midland:							
December 31 quarter	§1.00	411,553	669,517	.65	1.12	......	......
Six months, December 31 ..	§1.00	808,613	1,199,045	1.27	1.98	......	......
Bon Ami:							
Year, December 31	§*b*2.00	1,003,089	1,092,615	*b*2.87	*b*3.11	$155,289	$58,415
Canadian Industries:							
Year, December 31	§4.00	4,299,140	4,663,785	*c*5.85	*c*6.43	......	......
Certain-teed Products:							
Year, December 31	*f*....	259,978	†851,563	*p*4.12	....	......	......
Chickasha Cotton Oil:							
Six months, December 31 ..	*w*.50	214,190	403,442	.84	1.58	*......	*......
Commercial Solvents:							
December 31 quarter	§.60	1,097,569	495,743	.41	.19	......	......
Year, December 31	§.60	2,702,092	2,346,237	1.02	:89	461,321	764,645
Eagle-Picher Lead:							
Year, December 31	*f*....	583,620	†153,192	.61	....	......	......
Leslie-California Salt:							
December 31 quarter	1.40	36,642	22,490	.31	.19	......	......
Six months, December 31 ..	1.40	115,664	......	.99	....	......	......
Liquid Carbonic:							
December 31 quarter	§1.64	†84,829	†68,147	....	....	......	......
Molybdenum Corp. of America:							
Year, December 31	*f*....	257,513	277,547	.44	.48	......	......
National Lead:							
Year, December 31	§5.00	5,261,390	4,200,188	10.78	8.37	1,479,559	916,548
New Jersey Zinc:							
December 31 quarter	§2.00	1,323,784	955,231	.67	.49	342,152	*d*26,401
Year, December 31	§2.00	4,666,000	3,788,380	2.37	1.93	*d*242,160	*d*138,148
Penick & Ford:							
Year, December 31	3.00	1,052,960	1,405,514	2.85	3.80	*d*57,040	265,514
St. Joseph Lead:							
Year, December 31	*k*.40	486,200	†812,534	.25	....	*d*296,069	*d*1,399,235
Texas Gulf Producing:							
Year, December 31	*f*....	798,181	822,685	*h*.89	*h*.93	......	......
Tubize Chatillon:							
Year, December 31	*f*....	578,552	†262,068	*a*2.99	....	......	......
United Carbon:							
Year, December 31	2.40	1,872,405	1,452,939	4.70	3.55	......	......
United Piece Dye Works:							
Year, December 31	*f*....	†2,348,791	†1,870,516	....	....	......	......
Westvaco Chlorine Products:							
Year, December 28	.40	618,343	595,997	1.63	1.55	350,736	328,390

* Not available. † Net loss. § Plus extras. *a* On Cl. A stock. *c* On Cl. A and B shares. *b* On Cl. B shares. *d* Deficit. *f* No common dividend. *h* On shares outstanding at close of respective periods. *k* Paid in year 1935. *p* On preferred stock. *w* Last dividend declared, period not announced by company.

Annual Reports for Last Year

Company:	Fixed chgs. times earn.	Pfd. div. times earned	Cash and mark. securities	Inventories	Ratio cur. assets to cur. liab.	Working capital
Devoe & Raynolds:						
Year, Nov. 30, 1935	No. fd. dbt.	3.77	†$1,618,279	$2,806,948	11.6	$5,887,416
Year, Nov. 30, 1934	No. fd. dbt.	3.27	1,678,064	2,916,957	13.5	5,959,714
du Pont de Nemours:						
Year, Dec. 31, 1935	*c*........	9.47	*b*70,126,641	44,571,517	6.4	*b*121,449,400
Year, Dec. 31, 1934	*c*........	7.12	*b*61,695,842	43,669,986	6.5	*b*104,870,096
Freeport Texas:						
Year, Dec. 31, 1935	No fd. dbt.	20.21	†1,444,985	5,844,217	3.9	6,289,957
Year, Dec. 31, 1934	No fd. dbt.	19.14	†1,125,588	5,438,240	3.4	5,403,945
Industrial Rayon:						
Year, Dec. 31, 1935	No fd. dbt.	‡0.60	¶7,850,837	1,729,208	10.2	9,419,121
Year, Dec. 31, 1934	No fd. dbt.	‡1.33	¶7,136,360	2,129,176	10.3	9,339,096
United Carbon:						
Year, Dec. 31; 1935	No fd. dbt.	....	†766,043	704,324	2.7	1,679,869
Year, Dec. 31, 1934	No fd. dbt.	....	†1,189,605	751,927	3.6	2,168,032

† Cash only. ‡ Common dividends times earned; no preferred stock. ¶ Securities carried at cost. *b* Exclusive of investment in G. M. common stock. *c* Company has no direct funded debt.

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INDUSTRIAL CHEMICALS

JOSEPH TURNER & CO.

500 Fifth Ave., New York 83 Exchange Pl., Providence, R. I.

Chemical Stocks and Bonds

1936 February Last	1936 February High	1936 February Low	1935 High	1935 Low	1934 High	1934 Low	Sales: Number of shares Feb. 1936	Sales: Number of shares 1936	Stocks	Par $	Shares Listed	An. Rate*	Earnings $-per share-$ 1935	Earnings $-per share-$ 1934
NEW YORK STOCK EXCHANGE														
183	194	168½	173	104⅜	113	91¾	8,400	18,900	Air Reduction	No	841,288	$5.50	.....	4.98
172½	176	157	173	125	160¾	115⅛	26,000	52,400	Allied Chem. & Dye	No	2,214,099	6.00	.....	6.83
58	63¼	52	57¾	41½	48	25¼	12,900	28,400	Amer. Agric. Chem.	100	315,701	2.00	.....	p6.37
29⅜	31⅜	27	35¾	22½	62½	20¾	44,500	75,800	Amer. Com. Alcohol	20	260,716	None	.....	3.57
42	50	41½	52	36	39⅛	26¼	10,500	26,600	Archer-Dan-Midland	No	541,546	1.50	.....	p4.21
65	73	48	48½	32¾	55½	35¼	8,400	16,500	Atlas Powder Co.	No	234,235	2.00	2.81	2.49
121	121½	112	115	106¾	106¾	83	2,040	2,450	6% cum. pfd.	100	88,781	6.00	16.93	13.54
28⅝	32¼	27⅞	35⅜	19½	44⅞	17⅛	98,700	304,300	Celanese Corp. Amer.	No	987,800	None	.....	1.25
18½	20½	18⅛	21	15⅛	18⅛	9⅜	58,600	111,800	Colgate-Palm.-Peet	No	1,985,812	.75	.....	1.16
106½	106½	104½	107¼	101	102½	68½	1,700	2,600	6% pfd.	100	254,500	6.00	.....	15.14
102	109	94	101¼	67	77¼	58	13,000	26,600	Columbian Carbon	No	538,154	3.40	.....	3.93
23⅜	24⅝	20¼	23⅞	16½	36¾	15¾	498,300	757,800	Commer. Solvents	No	2,635,371	.60	1.02	.89
76¼	78½	68½	78⅜	60	84½	55½	77,800	122,400	Corn Products	25	2,530,000	3.00	.....	3.16
165	165	162	165	148¼	150½	135	600	1,500	7% cum. pfd.	100	243,739	7.00	.....	39.65
55	57½	42	50⅜	35½	55¼	29	13,100	20,200	Devoe & Rayn. A	No	95,000	2.00	.....	2.36
143⅞	150¼	138	146½	86⅝	103⅞	80	34,200	73,300	DuPont de Nemours	20	10,871,997	3.45	5.04	3.63
131	132⅜	129	132	126⅞	128½	115	3,800	5,000	6% cum. deb.	100	1,092,699	6.00	56.94	42.73
160½	163½	156½	172¼	110½	116½	79	9,100	19,400	Eastman Kodak	No	2,250,921	5.75	.....	6.28
164	165	158	164	141	147	120	260	360	6% cum. pfd.	100	61,657	6.00	.....	235.22
33½	35⅝	28½	30⅝	17¼	50⅜	21½	31,400	123,300	Freeport Texas	10	784,664	1.00	1.78	1.76
130	132	127½	125	112½	160⅛	113½	370	510	6% conv. pfd.	100	25,000	6.00	121.30	120.08
50	55¼	48	49½	23⅜	28⅜	15⅝	37,800	80,500	Glidden Co.	No	603,304	2.00	.....	x 2.91
110	114½	107	111	104⅞	107½	83	780	1,920	Glidden, 7% pfd.	100	63,044	7.00	.....	x40.70
128½	128½	120	119½	85	96⅞	74	3,600	7,600	Hazel Atlas	25	434,409	5.00	.....	5.21
101	105½	84	90	71	81⅝	59	9,500	24,300	Hercules Powder	No	582,679	3.50	.....	3.94
131½	131½	128	131	122	125¾	111	680	1,370	7% cum. pfd.	100	105,765	7.00	.....	28.79
30¼	31⅝	28½	36⅜	23½	32	19⅜	36,100	72,000	Industrial Rayon	No	600,000	1.68	.....	2.23
5⅛	5¾	3¾	5	2⅝	6⅛	2	106,400	146,100	Intern. Agricul.	No	436,049	None	.....	p—.99
36¾	40	34	42¾	26	37¼	15	12,800	21,000	7% cum. pr. pfd.	100	100,000	None	.....	p2.69
50½	54¼	44⅛	47¼	22¼	29¼	21	283,600	587,900	Intern. Nickel	No	14,584,025	1.00	.....	1.14
28	29¼	26¼	36¼	25	32	21	5,300	9,000	Intern. Salt	No	240,000	1.50	.....	2.02
33¼	36¾	32¼	36¼	31	33⅛	15¾	5,400	8,100	Kellogg (Spencer)	No	500,000	1.60	.....	v2.22
58	58⅝	47¼	49¼	21½	43⅞	22½	61,400	154,900	Libbey Owens Ford	No	2,559,042	1.20	.....	1.25
38	41½	36½	37¼	24½	35⅜	16⅛	14,500	47,700	Liquid Carbonic	No	342,406	1.25	.....	v2.58
34¼	36½	30	33⅞	23¾	40¾	23½	62,800	97,300	Mathieson Alkali	No	650,436	1.50	1.44	1.20
97	98	89¼	94¾	55	61⅝	39	10,400	26,600	Monsanto Chem.	10	864,000	1.25	.....	3.03
283	294	204	206	145	170	135	3,325	6,325	National Lead	100	309,831	5.00	10.78	8.38
160	162½	150	162½	150	146½	122	100	200	7% cum. "A" pfd.	100	243,676	7.00	25.40	20.12
141	141	137¾	140½	121⅝	121½	100½	730	1,170	6% cum. "B" pfd.	100	103,277	6.00	49.05	35.36
11⅜	13½	9⅞	10⅞	4⅜	13	5½	103,100	198,100	Newport Industries	1	519,347	None	.....	.31
147⅞	149	128	129	80	94	60	17,500	42,700	Owens-Illinois Glass	25	1,200,000	4.00	6.52	5.41
45½	49	45½	53¾	42⅜	44⅜	33⅛	30,600	57,500	Procter & Gamble	No	6,410,000	1.70	.....	p 2.23
122½	122½	119	121	115	117	102½	330	850	5% pfd. (ser. 2-1-29)	100	171,569	5.00	.....	p88.13
9	9¾	7½	8¾	4	6¾	3⅛	102,100	153,100	Tenn. Corp.	5	857,896	None	.....	.27
37½	38¾	33	36¾	28¾	43¼	30	73,300	165,300	Texas Gulf Sulphur	No	2,540,000	2.00	.....	1.81
82¾	87	71⅝	75¾	44	50⅞	35⅞	126,400	207,600	Union Carbide & Carbon	No	9,000,743	2.00	.....	2.28
75	79	68	78	46	50⅜	35	25,100	34,100	United Carbon	No	370,127	2.40	4.71	3.55
42⅛	44⅜	39	50⅝	35⅛	64¾	32	36,400	62,300	U. S. Indus. Alco.	No	391,033	2.00	.....	4.04
24	27¼	20¼	21¾	11¼	31¾	14	78,400	180,200	Vanadium Corp.-Amer.	No	366,637	None	.....	—2.29
7⅜	8¼	4⅛	4⅝	2½	5⅜	1⅞	186,300	203,400	Virginia-Caro. Chem.	No	486,000	None	.....	p—.79
43¾	46	32	35¾	17½	26	10	89,200	120,400	6% cum. part. pfd.	100	213,392	None	.....	p4.20
126½	126½	105	120½	85	84	59¾	1,500	3,100	7% cum. prior pfd.	100	60,000	8.00	.....	p23.50
25	28½	23	25½	16¾	27¼	14⅞	13,300	40,900	Westvaco Chlorine	No	284,962	.40	1.63	1.55
NEW YORK CURB EXCHANGE														
37½	40¾	29¼	30	15	22½	14⅝	56,900	149,400	Amer. Cyanamid "B"	No	2,404,194	.60	.....	.99
3⅛	3¾	3⅛	4	2	4⅛	2⅜	4,000	6,100	British Celanese Am. R.	10	2,806,000	None	.....	.....
113½	116¼	107½	115	90	105¼	81	650	2,200	Celanese, 7% cum. 1st pfd.	100	144,379	7.00	.....	16.37
115¾	116	107¼	111¼	97½	102	83	1,300	2,075	7% cum. prior pfd.	100	213,668	7.00	.....	28.13
12½	16½	12⅜	15	7	19	7	225	2,200	Celluloid Corp.	15	194,952	None	.....	—1.67
13¼	15	13¼	14½	11⅝	14⅜	10½	1,000	2,100	Courtaulds' Ltd.	1 £	24,000,000	7½%	.....	7.57%
104	105¾	95⅛	105½	80½	91	67½	11,100	17,000	Dow Chemical	No	945,000	2.00	.....	3.32
8⅞	10¾	8½	12½	6¼	10¾	4	8,200	15,500	Duval Texas Sulphur	No	500,000	None	.....	z .25
48	55	48	58	37	40¾	19	900	2,100	Heyden Chem. Corp.	10	147,600	1.50	.....	3.07
115	117	98¼	97¼	46¾	57½	39	9,700	19,140	Pittsburgh Plate Glass	25	2,141,305	2.90	.....	2.69
122¼	130	118	128⅞	84	90½	47¼	8,800	19,800	Sherwin Williams	25	635,583	4.00	.....	y6.19
112½	112½	109	113½	106	109¾	100	350	2,610	6% pfd. AA. cum.	100	155,521	6.00	.....	y33.17
PHILADELPHIA STOCK EXCHANGE														
123½	124	114¼	116¾	76½	75	50¼	275	595	Pennsylvania Salt	50	150,000	4.00	.....	p6.82

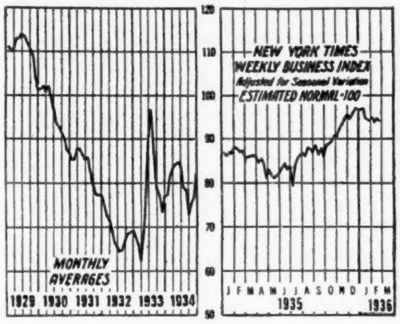
1936 February Last	1936 February High	1936 February Low	1935 High	1935 Low	1934 High	1934 Low	Sales Feb. 1936	Sales 1936	Bonds	Date Due	Int. %	Int. Period	Out-standing $
NEW YORK STOCK EXCHANGE													
115¼	117½	112½	116	104½	106¾	83⅞	582,000	1,113,000	Amer. I. G. Chem. Conv. 5½'s	1949	5½	M. N.	29,929,000
26½	30⅜	25	29¾	7⅜	17¾	5	779,000	1,286,000	Anglo Chilean s. f. deb. 7's	1945	7	M. N.	12,700,000
99	101¾	92⅛	94½	77⅜	88	61½	173,000	293,000	By-Products Coke Corp. 1st 5½'s "A"	1945	5½	M. N.	4,932,000
102½	102¾	99	100¼	91⅛	92	62	63,000	170,000	Int. Agric. Corp. 1st Coll. tr. stpd. to 1942	1942	5	M. N.	5,994,100
26	27¼	21	21½	7	19½	5⅛	1,487,000	4,435,000	Lautaro Nitrate conv. b's	1954	6	J. J.	31,357,000
76	76	66½	94	65	98½	89⅞	49,000	85,000	Montecatini Min & Agric. deb. 7's with war.	1937	7	J. J.	7,075,045
35	35	32⅛	38	32⅛	74½	34½	8,000	8,000	Ruhr Chem. 6's	1948	6	A. O.	3,156,000
104¼	105	103⅞	104	91½	90	65½	75,000	99,000	Tenn. Corp. deb. 6's "B"	1944	6	M. S.	3,007,900
92½	95¾	87	94¼	66	89½	62	251,000	285,000	Vanadium Corp. conv. 5's	1941	5	A. O.	4,261,000

† Year ended 5-31-35; *p* Year ended 9-30-35; *v* Year ended 8-1-35; *y* Year ended 8-31-35; *z* Year ended 8-31-35; * Including extras; *x* Year ended 10-31-35.

Industrial Trends

Cold Weather Retards Retail and Wholesale Business—Steel Industry Maintains Production Rate Above 50%—Automotive Production Declines in February—Business "Breathing Spell" Ends—

The severest winter weather encountered in many years, widespread throughout the major portion of the country, seriously curtailed retail and wholesale trade, hampered production and movement of products of the heavy industries, and postponed the usual seasonal spring rise in activity in many fields. Yet, despite subzero temperatures and clogged travel arteries, retail sales for the 1st 3 weeks held at about the same level as prevailed in the same weeks of last year. With a return to warmer weather in the final week, sales for the country as a whole increased 4 to 8% over the last week of February in '35. Wholesale markets turned more active in the last week, too, under the pressure of deferred commitments for spring merchandise. Also, with the flow of both raw materials and shipments less impeded, improvement extended to most industrial divisions.



Business activity declined in February.

Trend in Heavy Industries

Automobile production reached a low point in February and the weather is largely held responsible, for sales were far below expectations. Steel activity, however, held at better than a 50% rate, supported largely by increased demands from the railroads. With the opening up of building and expansion in automobile production the outlook over the next few months at least is bright. The process industries, such as textile, paint, glass and paper fields were still operating at a reduced pace last month but considerable improvement is looked for in March. A strike at one of the largest Akron rubber factories has unsettled that industry but there are hopes that efforts to keep the strike from spreading will be successful and some satisfactory basis of settlement worked out before the spring rush starts. The textile industry was relieved when the threatened dress strike in N. Y. City was averted at the last minute.

Prices Move in Narrow Limit

The movement of wholesale commodity prices during '36 to date has been characterized by irregular fluctuations and the absence of any definite trend. In the period from the 1st of the year through Feb. 22, the index compiled by The National Fertilizer Association moved in a relatively narrow range, between 77.5 and 78.5 (based on the 1926-1928 average as 100). Movements of other accepted indices confirm this generalization.

N. Y. Time Index Loses Ground

The N. Y. Times Index of Business Activity lost slightly in the 1st 3 weeks of the month, a decline of 7/10ths of a point, and most of this loss reflects the influence of lower production levels in the automotive field.

Why Business Has "Leveled Off"

It is not surprising that industrial activity in January and February leveled off, or perhaps even showed a moderate decline. During the last half of '35, and particularly in the last quarter, the trend of business was sharply upward; such a rapid improvement could not be expected to continue uninterruptedly. The leveling off which has occurred has been brought about largely by the decline in automobile output and by the effect of severe weather. It seems likely that the upward movement in business will be resumed this Spring when automobile production increases and construction work gets under way.

Political Considerations Again

The political situation is again coming to the fore and will unquestionably influence the business situation to a very serious degree. The "Breathing Spell" promised business by the Administration ended Mar. 1st, after a duration of 7 months, when the President forwarded the new corporation tax plan to Congress. Business leaders see in this new scheme, designed to make up the losses incurred by the demise of the AAA and to pay for the bonus, a very definite threat to further expansion by business, and very likely the proposed tax may become one of the leading issues in the coming presidential election.

Statistics of Business

	January 1936	January 1935	December 1935	December 1934	November 1935	November 1934
Automotive production	276,350	204,015	321,266	183,187	295,927	76,353
Bldg. contracts*‡	$204,793	$99,774	$264,136	$92,685	$188,155	$111,692
Failures, Dun & Bradstreet	1,077	1,146	940	963	927	923
Merchandise imports‡	$185,408	$168,482	z$186,863	$132,258	$168,955	$150,919
Merchandise exports‡	$195,564	$173,560	z$223,515	$170,654	$269,400	$194,712
Newsprint Production						
Canada, tons	227,955	201,959	244,732	239,544	262,854	240,869
U. S., tons	79,361	80,666	75,869	79,777	78,929	74,933
Newfoundland, tons	26,348	28,012	26,833	24,394	28,567	28,713
Mexico, tons	171	2,066	696	1,820	2,045	1,756
Total, tons	333,835	312,703	348,130	345,535	372,395	346,271
Plate glass prod., sq. ft.	17,275,632	13,265,188	16,112,218	......	15,909,262	6,587,366
Steel ingots production	3,049,439	2,871,531	3,081,807	1,964,257	3,153,247	1,610,625
Steel activity, % capacity	51.18	48.04	55.68	35.68	54.78	27.76
Pig iron production, tons	2,025,885	1,477,336	2,106,000	1,027,000	2,065,913	956,940
U. S. consumption, crude rubber, tons	......	......	42,942	36,569	42,778	......
Tire shipments	......	......	4,153,807	3,108,552	3,989,877	3,191,102
Tire production	......	......	4,051,286	3,778,418	3,997,025	3,340,859
Tire inventory	......	......	8,195,863	9,454,985	8,249,220	8,778,989
Dept. of Labor Indices†						
Factory payrolls, totals†	72.2	z64.3	76.6	63.2	74.5	59.5
Factory employment†	83.1	z78.8	84.6	78.1	84.9	76.9
Chemical price index†	......	......	......	78.2	......	80.9
Chemical employment†a	110.0	108.2	111.4	108.3	112.9	108.6
Chemical payrolls†a	97.5	90.5	z99.8	89.9	99.2	90.9
Chemicals and Related Products						
Exports‡	$9,096	$7,767	$8,873	$8,478	$10,463	......
Imports‡	$5,955	$6,738	$6,482	$4,437	$6,685	......
Stocks, mfd. goods†	......	......	120	116	118	114
Stocks, raw materials†	......	......	106	116	111	121
Cement prod., ratio of prod. to capacity	16.1	14.1	25.6	19.5	32.2	26.2
Anthracite prod., tons	y5,129,000	5,691,000	y4,620,000	4,687,000	2,868,490	3,600,652
Bituminous prod., tons	y36,600,000	34,681,000	y34,829,000	32,526,000	y33,010,000	30,856,000

Week Ending	Carloadings 1936	Carloadings 1935	Carloadings % of Change	Electrical Output§ 1936	Electrical Output§ 1935	Electrical Output§ % of Change	Jour. of Com. Price Index	National Fertilizer Assoc. Indices Chem. & Drugs	National Fertilizer Assoc. Indices Fert. Mat.	National Fertilizer Assoc. Indices Mixed Fert.	National Fertilizer Assoc. Indices All Groups	‡‡Labor Dept. Chem. & Drug Price Index	% Steel Activity	N. Y. Times Index Bus. Act.	Fisher's Index Pur. Power
Feb. 1	621,839	596,961	+ 4.2	1,962,827	1,762,671	+11.4	79.9	94.9	64.3	71.9	77.9	80.5	49.4	94.8	119.0
Feb. 8	622,097	591,327	+ 5.2	1,952,476	1,763,696	+10.7	79.9	94.9	64.3	71.9	77.5	80.2	50.0	93.9	119.8
Feb. 15	631,347	581,669	+ 8.5	1,950,278	1,760,562	+10.8	81.5	94.9	64.6	71.9	78.3	79.9	52.0	94.7	119.9
Feb. 22	586,712	553,165	+ 6.1	1,941,633	1,728,293	+12.3	81.1	94.9	64.5	71.9	77.8	79.9	51.7	94.1	119.4
Feb. 29	......	......	.....	....	....	.....	79.3	....	....	....	....	....	52.9	....	120.1

* 37 states; † Dept. of Labor, 3 year average, 1923-1925 = 100.0; ‡ 000 omitted; § K.W.H., 000 omitted; *a* Includes all allied products but not petroleum refining; ‡‡ 1926-1928 = 100.0; *y* Preliminary; *z* Revised.

Prices Current

Heavy Chemicals, Coal-tar Products, Dye-and-Tanstuffs, Colors and Pigments, Fillers and Sizes, Fertilizer and Insecticide Materials, Petroleum Solvents and Chemicals, Naval Stores, Fats and Oils, etc.

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f. o. b. works are specified as such. Import chemicals are so designated. Resale stocks when a market factor are quoted in addition to maker's prices and indicated "second hands."

Oils are quoted spot New York, ex-dock. Quotations f. o. b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f. o. b., or ex-dock. Materials sold f. o. b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both. Containers named are the original packages most commonly used.

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1935 Average $1.21 - Jan. 1935 $1.23 - Feb. 1936 $1.20

	Current Market		1936 Low	1936 High	1935 Low	1935 High
Acetaldehyde, drs, c-l, wgs lb.	...	.14	...	.14	...	.14
Acetaldol, 95%, 50 gal drs						
wks lb.	.21	.25	.21	.25	.21	.25
Acetamide, tech, lcl, kegs..lb.	.38	.43	.38	.43	.38	.43
Acetanalid, tech, 150 lb bbls lb.	.24	.26	.24	.26	.24	.26
Acetic Anhydride, 100 lb						
cbys lb.	.21	.25	.21	.25	.21	.25
Acetin, tech, drs lb.	.22	.24	.22	.24	.22	.24
Acetone, tks, delv lb.	...	.09½	.09½	.12	.11	.12
drs, c-l, delv lb.	...	.10½	.10½	.12	...	.12
Acetyl chloride, 100 lb cbys lb.	.55	.68	.55	.68	.55	.68
ACIDS						
Abietic, kgs, bbls lb.	.06¾	.07	.06¾	.07	.06¾	.07
Acetic, 28%, 400 lb bbls,						
c-l, wks 100 lbs.	...	2.45	...	2.45	2.40	2.45
glacial, bbls, c-l, wks 100 lbs.	...	8.43	...	8.43	8.25	8.43
glacial, USP, bbls, c-l,						
wks 100 lbs.	...	12.43	...	12.43	12.25	12.43
Adipic, kgs, bbls lb.	...	.72	...	.72	...	.72
Anthranilic, refd, bbls lb.	.85	.95	.85	.95	.85	.95
tech, bbls lb.	...	.75	...	.75	...	.75
Battery, cbys, delv 100 lbs.	1.60	2.25	1.60	2.25	1.60	2.25
Benzoic, tech, 100 lb kgs lb.	.40	.45	.40	.45	.40	.45
USP, 100 lb kgs lb.	.54	.59	.54	.59	.54	.59
Boric, tech, gran, 80 tons,						
bgs, delv ton *a*	...	95.00	...	95.00	80.00	95.00
Broenner's, bbls lb.	1.20	1.25	1.20	1.25	1.20	1.25
Butyric, 95%, cbys lb.	.53	.60	.53	.60	.53	.60
edible, c-l, wks, cbys lb.	1.20	1.30	1.20	1.30	1.20	1.30
synthetic, c-l, drs lb.	...	.22	...	.22	...	.22
wks lb.	...	.23	...	.23	...	.23
tks, wks lb.	...	.21	...	.21	...	.21
Camphoric, drs lb.	...	5.25	...	5.25	...	5.25
Chicago, bbls lb.	...	2.10	...	2.10	...	2.10
Chlorosulfonic, 1500 lb drs,						
wks lb.	.03½	.05	.03½	.05	.03½	.05½
Chromic, 99¾%, drs, delv lb.	.14¾	.16¾	.14¾	.16¾	.13¾	.16¾
Citric, USP, crys, 230 lb						
bbls lb. *b*	.28	.29	.28	.29	.28	.29
anhyd, gran, drs lb. *b*	...	.31	...	.31	...	.31
Cleve's, 250 lb bbls lb.	.52	.54	.52	.54	.52	.54
Cresylic, 99%, straw, HB,						
drs, wks, frt equal gal.	.51	.53	.51	.53	.46	.53
99%, straw, LB, drs, wks,						
frt equal gal.	.68	.70	.68	.70	.64	.68
resin grade, drs, wks,						
frt equal gal.	.52	.53	.52	.53	.52	.55
Crotonic, drs lb.	.90	1.00	.90	1.00	.90	1.00
Formic, tech, 140 lb drs lb.	.11	.13	.11	.13	.11	.13
Fumaric, bbls lb.	...	.60	...	.60	...	.60
Fuming, see Sulfuric (Oleum)						
Fuoric, tech, 90%, 100 lb						
drs lb.	...	.35	...	.35	...	.35
Gallic, tech, bbls lb.	.65	.68	.65	.68	.65	.68
USP, bbls lb.	.70	.80	.70	.80	.70	.80
Gamma, 225 lb bbls, wks lb.	.80	.84	.80	.84	.77	.79
H, 225 lb. bbls, wks lb.	.50	.55	.50	.55	.50	.55
Hydriodic, USP, 10% sol.						
cbys lb.	.50	.51	.50	.51	.50	.51
Hydrobromic, 48% com 155						
lb cbys, wks lb.	.45	.48	.45	.48	.45	.48
Hydrochloric, see muriatic.						
Hydrocyanic, cyl. wks lb.	.80	1.30	.80	1.30	.80	1.30
Hydrofluoric, 30%, 400 lb						
bbls, wks lb.	.07	.07½	.07	.07½	.07	.07½
Hydrofluosilicic, 35%, 400						
bbls, wks lb.	.11	.12	.11	.12	.11	.12
Lactic, 22%, dark, 500 lb.						
bbls lb.	.04½	.05	.04½	.05	.04½	.05
22%, light refd, bbls lb.	.06½	.07	.06½	.07	.06½	.07
44%, light, 500 lb bbls lb.	.11½	.12	.11½	.12	.11½	.12
44%, dark, 500 lb bbls lb.	.09½	.10	.09½	.10	.09½	.10
50%, water white, 500						
lb bbls lb.	...	.14½	...	.14½	...	...
USP X, 85%, cbys lb.	.45	.50	.45	.50	.45	.50
Laurent's, 250 lb bbls lb.	.46	.47	.46	.47	.36	.37
Linoleic, bbls lb.	.16	.16	.16	.16	.16	.16
Maleic, powd, kgs lb.	.29	.32	.29	.32	.29	.32
Malic, powd, kgs lb.	.45	.60	.45	.60	.45	.60
Metanillic, 250 lb bbls lb.	.60	.65	.60	.65	.60	.65
Mixed, tks, wks N unit	.06½	.07¼	.06½	.07¼	.06½	.07¼
S unit	.008	.009	.008	.009	.008	.009
Monochloracetic, tech, bbls lb.	.16	.18	.16	.18	.16	.18
Monosulfonic, bbls lb.	1.50	1.60	1.50	1.60	1.50	1.60
Muriatic, 18°, 120 lb cbys,						
c-l, wks 100 lb.	...	1.35	...	1.35	...	1.35
tks, wks 100 lb.	...	1.00	...	1.00	...	1.00

a Powdered boric acid $5 a ton higher in each case; USP $15 higher; *b* Powdered citric is ½c higher; kegs are in each case ½c higher than bbls.

	Current Market		1936 Low	1936 High	1935 Low	1935 High
Muriatic (cont.):						
20°, cbys, c-l, wks 100 lb.	...	1.45	...	1.45	...	1.45
tks, wks 100 lb.	...	1.20	...	1.20	...	1.20
22°, c-l, cbys, wks 100 lb.	...	1.95	...	1.95	...	1.95
tks, wks 100 lb.	...	1.60	...	1.60	...	1.60
CP, cbys lb.	.06½	.07⅛	.06½	.07⅛	.06½	.07⅛
N & W, 250 lb bbls lb.	.85	.87	.85	.87	.85	.87
Naphthenic, 240-280 s. v.,						
drs lb.	.11	.14	.11	.14	.11	.14
Sludges, drs lb.	.06	.10	.06	.10	...	...
Naphthionic, tech, 250 lb						
bbls lb.	.60	.65	.60	.65	.60	.65
Nitric, 36°, 135 lb cbys, c-l,						
wks 100 lb. *c*	...	5.00	...	5.00	...	5.00
38°, c-l, cbys, wks 100 lb. *c*	...	5.50	...	5.50	...	5.50
40°, cbys, c-l, wks 100 lb. *c*	...	6.00	...	6.00	...	6.00
42°, c-l, cbys, wks 100 lb. *c*	...	6.50	...	6.50	...	6.50
CP, cbys, delv lb.	.11½	.12½	.11½	.12½	.11½	.12½
Oxalic, 300 lb bbls, wks, or						
N. Y. lb.	.11½	.12½	.11½	.12½	.11½	.12½
Phosphoric, 50%, USP,						
cbys lb.	.14	.14	.14	.14	.14	.14
50%, acid, c-l, drs, wks lb.	.06	.08	.06	.08	.06	.08
75%, acid, c-l, drs, wks lb.	.09	.10½	.09	.10½	.09	.10½
Picramic, 300 lb bbls, wks lb.	.65	.70	.65	.70	.65	.70
Picric, kgs, wks lb.	.30	.40	.30	.40	.30	.40
Propionic, 98% wks, drs lb.	...	.35	...	.35	...	.35
80% lb.	.15	.17½	.15	.17½	.15	.17½
Pyrogallic, crys. kgs, wks lb.	1.55	1.65	1.55	1.65	1.55	1.65
Salicylic, tech, 125 lb bbls,						
wks lb.	...	.40	...	.40	...	.40
Sebacic, tech, drs, wks lb.	...	.58	...	.58	...	.58
Succinic, bbls lb.	...	.75	...	.75	...	.75
Sulfanilic, 250 lb bbls, wks lb.	.18	.19	.18	.19	.18	.19
Sulfuric, 60°, tks, wks ton	...	11.00	...	11.00	...	11.00
c-l, cbys, wks 100 lb.	...	1.10	...	1.10	...	1.10
66°, tks, wks ton	...	15.50	...	15.50	...	15.50
c-l, cbys, wks 100 lb.	...	1.35	...	1.35	...	1.35
CP, cbys, wks lb.	.06½	.07½	.06½	.07½	.06½	.07½
Fuming (Oleum) 20% tks,						
wks ton	...	18.50	...	18.50	...	18.50
Tannic, tech, 300 lb bbls lb.	.23	.40	.23	.40	.23	.40
Tartaric, USP, gran powd,						
300 lb bbls lb.	...	.24	...	.24	.24	.25
Tobias, 250 lb bbls lb.	.70	.72½	.70	.72½	.70	.80
Trichloroacetic bottles lb.	2.45	2.75	2.45	2.75	2.45	2.75
kgs lb.	...	1.75	...	1.75	...	1.75
Tungstic, tech, bbls lb.	1.50	1.60	1.50	1.60	1.50	1.60
Vanadic, drs, wks lb.	1.10	1.20	1.10	1.20	1.10	1.20
Albumen, light flake, 225 lb						
bbls lb.	.50	.60	.50	.60	.45	.60
dark, bbls lb.	.12	.17	.12	.17	.12	.17
egg, edible lb.	.79	.81	.79	1.05	.85	1.05
vegetable, edible lb.	.65	.70	.65	.70	.65	.70
ALCOHOLS						
Alcohol, Amyl (from Pentane)						
tks, delv lb.	...	.143	...	.143	...	...
c-l, drs, delv lb.	...	.150	...	.150	...	...
lcl, drs, delv lb.	...	.157	...	.157	...	...
Amyl, secondary, tks, delv						
lb.	...	.108	...	.108	...	.108
Benzyl, bottles lb.	.65	1.10	.65	1.10	.65	1.10
Butyl, normal, tks, delv lb. *d*	...	.09½	.09½	.11	.11	.12
c-l, drs, delv lb. *d*	...	.10½	.10½	.12	.12	.13
Butyl, secondary, tks,						
delv lb. *d*	...	.07½	.07½	.096	...	.096
c-l, drs, delv lb. *d*	...	.08½	.08½	.106	...	.106
Capryl, drs, tech, wks lb.	...	.85	...	.85	...	.85
Cinnamic, bottles lb.	3.25	3.65	3.25	3.65	3.25	3.65
Denatured, No. 5, c-l, drs,						
wks gal. *e*	...	.44	...	.44	.34	.49
Western schedule, c-l,						
wks gal. *e*	...	.52	...	.52	.38	.52
Denatured, No. 1, tks,						
wks gal. *e*	...	.28	...	.28	.29½	.31
c-l, drs, wks gal. *e*	...	.34	...	.34	.34½	.36
Western schedule, tks,						
wks gal. *e*	...	.34	...	.34	.32½	.35
c-l, drs, wks gal. *e*	...	.39	...	.39	.37½	.40
Diacetone, tech, tks,						
delv lb. *f*	...	.16	...	.16	...	.16
c-l, drs, delv lb. *f*	...	.17	...	.17	...	.17

c Yellow grades 25c per 100 lbs. less in each case; *d* Spot prices are 1c higher; *e* Anhydrous is 5c higher in each case; *f* Pure prices are 1c higher in each case; * Dealers are given 20% off this price.

ABBREVIATIONS—Anhydrous, anhyd; bags, bgs; barrels, bbls; carboys, cbys; carlots, c-l; less-than-carlots, lcl; drums, drs; kegs, kgs; powdered, powd; refined, ref'd; tanks, tks; works, f.o.b., wks.

Prices—Current

	Current Market		1936 Low	1936 High	1935 Low	1935 High
Alcohols (continued)						
Ethyl, 190 proof, molasses, tks ....gal. *g*	...	4.07	4.07	4.10	4.08½	4.10
c-l, drs ....gal. *g*	...	4.12	4.12	4.27	4.13½	4.27
c-l, bbls ....gal. *g*	...	4.13	4.13	4.28	4.15½	4.28
absolute, drs ....gal. *g*	4.54	6.08½	4.54	6.11½	4.55½	6.11½
Furfuryl, tech, 500 lb, drs ....lb.	...	.35	...	.35	...	.35
Hexyl, secondary tks, delv lb.	...	.11½	...	.11½	...	.11½
c-l, drs, delv ....lb.	...	.12½	...	.12½	...	.12½
Normal, drs, wks ....lb.	3.25	3.50	3.25	3.50	3.25	3.50
Isoamyl, prim. cans, wks lb.	...	.32	...	.32	...	...
drs, lcl, delvd ....lb.	...	.27	...	.27	...	...
Isobutyl, refd, lcl, drs ..lb.	...	.12	...	.12	.12	.60
c-l, drs ....lb.	...	.11½	...	.11½	...	...
tks ....lb.	...	.10½	...	.10½	...	...
Isopropyl, refd. c-l, drs..lb.	...	.55	...	.55	...	.55
Propyl, norm, 50 gal drs gal.	...	.75	...	.75	...	.75
Special Solvent, tks, wks gal.	...	.29	.29	.32	...	...
Western points, tks, wks ....gal.	...	.35	...	.35	...	...
Aldehyde ammonia, 100 gal drs ....lb.	.80	.82	.80	.82	.80	.82
Alphanaphthol, crude, 300 lb bbls ....lb.	.60	.65	.60	.65	.60	.65
Alphanaphthylamine, 350 lb bbls ....lb.	.32	.34	.32	.34	.32	.34
Alum, ammonia, lump, c-l, bbls, wks ....100 lb.	...	3.00	...	3.00	...	3.00
25 bbls or more, wks ....100 lb.	...	3.15	...	3.15	...	3.15
less than 25 bbls, wks ....100 lb.	...	3.25	...	3.25	...	3.25
Granular, c-l, bbls, wks 100 lb.	...	2.75	...	2.75	...	2.75
25 bbls or more, wks 100 lb.	...	2.90	...	2.90	...	2.90
Powd, c-l, bbls, wks 100 lb.	...	3.15	...	3.15	...	3.15
25 bbls or more, wks 100 lb.	...	3.30	...	3.30	...	3.30
Chrome, bbls ....100 lb.	7.00	7.25	7.00	7.25	7.00	7.25
Potash, lump, c-l, bbls, wks ....100 lb.	...	3.25	...	3.25	...	3.25
25 bbls or more, wks 100 lb.	...	3.40	...	3.40	...	3.40
Granular, c-l, bbls, wks 100 lb.	...	3.40	...	3.40	...	3.00
25 bbls or more, bbls, wks ....100 lb.	...	3.00	...	3.00	...	3.15
Powd, c-l, bbls, wks 100 lb.	...	3.40	...	3.40	...	3.40
25 bbls or more, wks 100 lb.	...	3.55	...	3.55	...	3.55
Soda, bbls, wks ....100 lb.	4.00	4.15	4.00	4.15	4.00	4.15
Aluminum metal, c-l, NY ....100 lb.	19.00	20.00	19.00	20.00	19.00	23.30
Acetate, CP, 20%, bbls lb.	.09	.10	.09	.10	.09	.10
Chloride anhyd, 99%, wks lb.	.07	.12	.07	.12	.07	.12
93%, wks ....lb.	.05	.08	.05	.08	.05	.08
Crystals, c-l, drs, wks ..lb.	.06½	.07	.06½	.07	.06½	.07
Solution, drs, wks ....lb.	.03	.03½	.03	.03½	.03	.03½
Hydrate, 96%, light, 90 lb. bbls, delv ....lb.	.13	.15	.13	.15	.13	.15
heavy, bbls, wks ....lb.	.04	.04½	.04	.04½	.04	.04½
Oleate, drs ....lb.	...	.15¾	...	.15¾	...	.15¾
Palmitate, bbls ....lb.	.21	.22	.21	.22	.20	.22
Resinate, pp., bbls ....lb.	...	.15	...	.15	...	.15
Stearate, 100 lb bbls ...lb.	.18	.20	.18	.20	.17	.20
Sulfate, com, c-l, bgs, wks ....100 lb.	...	1.35	...	1.35	...	1.35
c-l, bbls, wks ....100 lb.	...	1.55	...	1.55	...	1.55
Sulfate, iron-free, c-l, bgs, wks ....100 lb.	...	1.90	...	1.90	...	1.90
c-l, bbls, wks ....100 lb.	...	2.05	...	2.05	...	2.05
Aminoazobenzene, 110 lb kgs ....lb.	...	1.15	...	1.15	...	1.15
Ammonia anhyd com, tks..lb.	.04½	.05½	.04½	.05½	.04½	.05½
Ammonia anhyd, 100 lb cyl lb.	.15¼	.21½	.15¼	.21½	.15¼	.21½
26°, 800 lb drs, delv ....lb.	.02½	.03	.02½	.03	.02½	.03
Aqua 26°, tks, NH ..cont.	...	.05	...	.05	...	.05
tk wagon ....lb.	...	.024	...	.024	...	.024
Ammonium Acetate, kgs ..lb.	.26	.33	.26	.33	.26	.33
Bicarbonate, bbls, f.o.b. plant ....100 lb.	5.15	5.71	5.15	5.71	5.15	5.71
Bifluoride, 300 lb bbls ..lb.	.15	.17	.15	.17	.15	.17
carbonate, tech, 500 lb bbls ....lb.	.08	.12	.08	.12	.08	.12
Chloride, White, 100 lb bbls, wks ....100 lb.	4.45	4.90	4.45	4.90	4.45	4.90
Gray, 250 lb bbls, wks ..lb.	5.00	5.75	5.00	5.75	5.00	5.75
Lump, 500 lbs cks spot lb.	.10½	.11	.10½	.11	.10½	.11
Lactate, 500 lb bbls ....lb.	.15	.16	.15	.16	.15	.16
Linoleate ....lb.	.11	.12	.11	.12	.11	.12
Nitrate, tech, cks ....lb.	.04	.05	.04	.05	.04	.05
Oleate, drs ....lb.	...	.10	...	.10	...	.10
Oxalate, neut, cryst, powd, bbls ....lb.	.26	.27	.26	.27	.26	.27
pure, cryst, bbls, kgs..lb.	.27	.28	.27	.28	.27	.28
Perchlorate, kgs ....lb.	...	.16	...	.16	...	.16
Persulfate, 112 lb kgs ..lb.	.22½	.25	.22½	.25	.22½	.25
Phosphate, dibasic tech, powd, 325 lb bbls ....lb.	.07½	.10	.07½	.10	.08	.10
Sulfate, dom, f.o.b., bulk ton	23.00	25.00	22.00	25.00	20.00	24.00
200 lb bgs ....ton	...	nom.	...	nom.	25.50	25.80
100 lb bgs ....lb.	...	nom.	...	nom.	26.00	26.50
Sulfocyanide, kgs ....lb.	...	.55	...	.55	...	.50
Amyl Acetate (from pentane) tks, delv ....lb.	...	.13½	...	.13½	...	.13½
tech, drs, delv ....lb.	.142	.149	.142	.149	.142	.149
secondary, tks, delv ..lb.	...	.108	...	.108	...	.108
c-l, drs, delv ....lb.	.118	.123	.118	.123	.118	.123
Amyl Chloride, norm drs, wks ....lb.	.56	.68	.56	.68	.56	.68
Chloride, mixed, drs, wks lb.	.07	.077	.07	.077	.07	.077
tks, wks ....lb.	...	.06	...	.06	...	.06
Mercaptan, drs, wks ....lb.	...	1.10	...	1.10	...	1.10

g Grain alcohol 20c a gal. higher in each case.

	Current Market		1936 Low	1936 High	1935 Low	1935 High
Amylene, drs, wks ....lb.	.102	.11	.102	.11	.102	.11
tks, wks ....lb.	...	.09	...	.09	...	.09
Aniline Oil, 960 lb drs and tks ....lb.	.15	.17½	.15	.17½	.15	.17½
Annatto fine ....lb.	.34	.37	.34	.37	.34	.37
Anthracene, 80% ....lb.	...	.75	...	.75	...	.75
40% ....lb.	...	.18	...	.18	...	.18
Anthraquinone, sublimed, 125 lb bbls ....lb.	.50	.52	.50	.52	.50	.52
Antimony metal slabs, ton lots ....lb.	...	.13¼	.12½	.13¼	.12½	.16
Needle, powd, bbls ....lb.	.12	.12½	.12	.12½	.09	.13½
Butter of, see Chloride.						
Chloride, soln cbys ....lb.	.13	.17	.13	.17	.13	.17
Oxide, 500 lb bbls ....lb.	.13½	.13¾	.13½	.14	.10¼	.15
Salt, 63% to 65%, tins..lb.	.22	.24	.22	.24	.22	.24
Sulfuret, golden, bbls...lb.	.22	.23	.22	.23	.19	.23
Vermilion, bbls ....lb.	.35	.42	.35	.42	.35	.42
Archil, conc, 600 lb bbls ..lb.	.21	.27	.21	.27	.21	.27
Double, 600 lb bbls ....lb.	.18	.20	.18	.20	.18	.20
Triple, 600 lb bbls ....lb.	.18	.20	.18	.20	.18	.20
Argols, 80%, casks ....lb.	.14	.15	.14	.15	.15	.16
Crude, 30%, casks ....lb.	.07	.08	.07	.08	.07	.08
Aroclors, wks ....lb.	.18	.30	.18	.30	.18	.30
Arrowroot, bbl ....lb.	.08¾	.09¼	.08¾	.09¼	.08¾	.09¼
Arsenic, Red, 224 lb cs kgs lb.	...	.15¾	...	.15¾	...	.15¾
White, 112 lb kgs ....lb.	.03½	.04½	.03½	.04½	.03½	.04½
Metal ....lb.	.40	.42	.40	.42	.40	.42
Asbestine, c-l, wks ....ton	13.00	15.00	13.00	15.00	13.00	15.00
Barium Carbonate precip, 200 lb bgs, wks ....ton	56.50	61.00	56.50	61.00	56.50	61.00
Nat (witherite) 90% gr, c-l, wks, bgs ....ton	42.00	45.00	42.00	45.00	42.00	45.00
Chlorate, 112 lb kgs NY lb.	.15½	.17½	.15½	.17½	.14	.17½
Chloride, 600 lb bbl, wks ton	72.00	74.00	72.00	74.00	72.00	74.00
Dioxide, 88%, 690 lb drs lb.	.11	.12	.11	.12	.11	.12
Hydrate, 500 lb bbls ....lb.	.05½	.06	.05½	.06	.05½	.06
Nitrate, 700 lb cks ....lb.	...	.08¼	...	.08¼	...	.08¼
Barytes, floated, 350 lb bbls wks ....ton	23.65	31.15	23.65	31.15	23.00	31.15
Bauxite, bulk, mines ....ton	7.00	10.00	7.00	10.00	7.00	10.00
Bentonite, c-l, No. 1, bgs, wks ....ton	...	16.50	...	16.50	16.50	18.00
No. 2 ....ton	...	11.00	...	11.00	11.00	12.50
Benzaldehyde, tech, 945 lb drs, wks ....lb.	.60	.62	.60	.62	.60	.62
Benzene (Benzol), 90%, Ind, 8000 gal tks, frt allowed ....gal.	...	.18	...	.18	.15	.18
90% c-l, drs ....gal.	...	.23	...	.23	.23	.24
Ind Pure, tks, frt allowed ....gal.	...	.18	...	.18	.15	.18
Benzidine Base, dry, 250 lb bbls ....lb.	.72	.74	.72	.74	.67	.69
Benzoyl Chloride, 500 lb drs lb.	.40	.45	.40	.45	.40	.45
Benzyl Chloride, tech, drs..lb.	.30	.40	.30	.40	.30	.40
Beta-Naphthol, 250 lb bbl, wks ....lb.	.24	.27	.24	.27	...	.24
Naphthylamine, sublimed, 200 lb bbls ....lb.	1.25	1.35	1.25	1.35	1.25	1.35
Tech, 200 lb bbls ....lb.	.53	.55	.53	.55	.53	.55
Bismuth metal	1.00	1.10	1.00	1.10	.90	1.20
Chloride, boxes ....lb.	3.20	3.25	3.20	3.25	3.20	3.25
Hydroxide, boxes ....lb.	3.15	3.20	3.15	3.20	3.15	3.20
Oxychloride, boxes ....lb.	2.95	3.00	2.95	3.00	2.95	3.00
Subbenzoate, boxes ....lb.	3.25	3.30	3.25	3.30	3.25	3.30
Subcarbonate, kgs ....lb.	1.40	1.45	1.40	1.45	1.55	1.70
Trioxide, powd, boxes...lb.	3.45	3.50	3.45	3.50	3.45	3.50
Subnitrate	1.30	1.35	1.30	1.35	1.30	1.45
Blackstrap, cane (see Molasses, Blackstrap).						
Blanc Fixe, 400 lb bbls, wks ....ton *h*	42.50	70.00	42.50	70.00	42.50	70.00
Bleaching Powder, 800 lb drs, c-l, wks, contract..100 lb.	...	2.00	...	2.00	1.90	2.00
lcl, drs, wks	2.25	3.60	2.25	3.60	2.15	3.60
Blood, dried, f.o.b., NY..unit	...	3.20	3.10	3.20	2.50	3.25
Chicago, high grade ...unit	...	3.25	3.25	3.50	2.50	3.75
Imported shipt ....unit	3.00	3.05	3.00	3.05	2.75	3.30
Blues, Bronze Chinese Milori Prussian Soluble ....lb.	.37	.38½	.37	.38½	.36½	.38
Ultramarine,* dry, wks, bbls ....lb.	...	.10	...	.10	...	...
Regular grade, group 1 lb.	...	.15	...	.15	...	...
Special, group 1....lb.	...	.18	...	.18	...	...
Pulp, No. 1 ....lb.	...	.26	...	.26	...	...
Bone, 4½ + 50% raw, Chicago ....ton	20.00	22.00	20.00	22.00	19.00	22.00
Bone Ash, 100 lb kgs ....lb.	.06	.07	.06	.07	.06	.07
Black, 200 lb bbls ....lb.	.05½	.08¼	.05½	.08¼	.05½	.08¼
Meal, 3% & 50%, imp..ton	...	23.25	...	23.25	22.75	24.00
Domestic, bgs, Chicago..ton	17.00	19.00	17.00	20.00	16.00	21.00
Borax, tech, gran, 80 ton lots, sacks, delv ....ton *i*	...	40.00	...	40.00	36.00	40.00
bbls, delv ....ton *i*	...	50.00	...	50.00	46.00	50.00
c-l, sacks, delv ....ton *i*	...	44.00	...	44.00	40.00	44.00
c-l, bbls, delv ....ton *i*	...	54.00	...	54.00	50.00	54.00
Tech, powd, 80 ton lots, sacks ....ton *i*	...	45.00	...	45.00	41.00	45.00
bbls, delv ....ton *i*	...	56.00	...	56.00	51.00	56.00
c-l, sacks, delv ....ton *i*	...	49.00	...	49.00	45.00	49.00
c-l, bbls, delv ....ton *i*	...	59.00	...	59.00	55.00	59.00
Bordeaux Mixture, jobbers, East, c-l, tins, drs, cases lb.	.08	.16	.08	.16	.08	.16
Jobbers, West, c-l ....lb.	.08	.10	.08	.10	.08	.10
Dealers, East, c-l ....lb.	.08½	.16½	.08½	.16½	.08½	.16½
Dealers, West, c-l ....lb.	.09	.11	.09	.11	.09	.11

h Lowest price is for pulp, highest for high grade precipitated; *i* Crystals $6 per ton higher; USP, $15 higher in each case; * Freight is equalized in each case with nearest producing point.

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HCl	HNO_3	H_2SO_4	H_2SO_4
$C_2O_4H_2.2H_2O$	H_2SO_4	KOH	KOH
H_2SO_4	KOH	NaOH	NaOH
$(NH_4)CNS$	NaOH		
I			
$K_2Cr_2O_7$			
$KBrO_3$			
KOH			
$KMnO_4$			
$AgNO_3$			
Na_2HAsO_3			
$NaBrO_3$			
Na_2CO_3			
NaCl			
NaOH			
$C_2O_4Na_2$			
$Na_2S_2O_3+5H_2O$			

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	Current Market		1936 Low	1936 High	1935 Low	1935 High
Bromine, cases ....lb.	.30	.43	.30	.43	.30	.43
Bronze, Al, pwd, 300 lb drs lb.	.80	1.50	.80	1.50	.80	1.50
Gold, blk ....lb.	.40	.55	.40	.55	.40	.55
Butanes, com 16-32° group 3 tks ....lb.	...	.04	...	.04	...	.04
Butyl, Acetate, norm drs, frt allowed ....lb.	.10½	.11	.10½	.12½	.12	.13½
tks, frt allowed ....lb.	...	.09½	.09½	.11	.11	.13
Secondary, tks, frt allowed ....lb.	...	.07½	.07½	.096	...	.096
drs, frt, allowed .....lb.	.08½	.09	.106	.111	.106	.111
Aldehyde, 50 gal drs, wks ....lb.	.19	.21	.19	.21	.19	.21
Carbinol, norm drs, wks lb.	.60	.75	.60	.75	.60	.75
Lactate, drs ....lb.	.22½	.23½	.22½	.23½	.22½	.23½
Propionate, drs ....lb.	.18	.18½	.18	.18½	.18	.18½
tks, delv ....lb.	...	.17	...	.17	...	.17
Stearate, 50 gal drs ....lb.	...	.26	...	.26	...	.26
Tartrate, drs ....lb.	.55	.60	.55	.60	.55	.60
Cadmium, Sulfide, boxes...lb.	1.00	1.10	1.00	1.10	.75	.85
Cadmium Metal ....lb.	...	1.05	.85	1.05	.55	.90
Calcium, Acetate, 150 lb bgs c-l, delv ....100 lb.	...	2.10	...	2.10	2.00	2.10
Arsenate, jobbers, East of Rocky Mts, drs ......lb.	.06	.06⅜	.06	.06⅜	.06	.06½
dealers, drs ....lb.	.06¼	.07¾	.06¼	.07¾	.06¼	.07¾
South, jobbers, drs .....lb.	.06	.06½	.06	.06½	.06	.06½
dealers, drs ....lb.	.06½	.06¾	.06½	.06¾	.06¼	.06¾
Carbide, drs ....lb.	.05	.06	.05	.06	.05	.06
Carbonate, tech, 100 lb bgs c-l ....lb.	1.00	1.00	1.00	1.00	1.00	1.00
Chloride, flake, 375 lb drs, c-l, wks ....ton	...	19.50	...	19.50	...	19.50
Solid, 650 lb drs, c-l, f.o.b. wks ....ton	...	17.50	...	17.50	...	17.50
Ferrocyanide, 350 lb bbls wks ....lb.	...	.17	...	.17	...	.17
Gluconate, tech, 125 lb bbls ....lb.	...	.28	...	.28	...	.28
Nitrate, 100 lb bgs ....ton	...	26.50	...	26.50	...	26.50
Palmitate, bbls ....lb.	.21	.22	.21	.22	.20	.22
Peroxide, 100 lb drs ....lb.	...	1.25	...	1.25	...	1.25
Phosphate, tech, 450 lb bbls ....lb.	.07½	.08	.07½	.08	.07½	.08
Resinate, precip, bbls ...lb.	.13	.14	.13	.14	.13	.14
Stearate, 100 lb bbls ...lb.	.18	.20	.18	.20	.17	.20
Camphor, slabs ....lb.	.55	.56	.55	.56	.49	.57
Powder ....lb.	.55	.56	.55	.56	.50	.57
Camwood, Bk, ground bbls lb.	.16	.18	.16	.18	.16	.18
Carbon, Decolorizing, drs c-l ....lb.	.08	.15	.08	.15	.08	.15
Black, c-l, bgs, delv, price varying with zone ....lb.	.0445	.0535	.0445	.0535	.0445	.0535
lcl, bgs, delv, all zones lb.	...	.07	...	.07	...	.07
cartons, delv ......lb.	...	.07¾	...	.07¾	...	.07¾
cases, delv ....lb.	...	.08¼	...	.08¼	...	.08¼
Bisulfide, 500 lb drs ....lb.	.05¼	.08	.05¼	.08	.05¼	.08
Dioxide, Liq 20-25 lb cyl lb.	.06	.08	.06	.08	.06	.08
Tetrachloride, 1400 lb drs, delv ....lb.	.05¼	.06	.05¼	.06	.05¼	.06
Casein, Standard, Dom, grd lb.	.14½	.16	.14½	.16¾	.09½	.16¾
80-100 mesh, c-l, bgs....lb.	.15	.17	.15	.17¼	.10	.17¼
Castor Pomace, 5½ NH_3, c-l, bgs, wks ....ton	...	15.50	...	15.50	16.00	18.50
Imported, ship, bgs ....ton	...	17.50	...	17.50	17.25	20.00
Celluloid, Scraps, ivory cs lb.	.17	.18	.17	.18	.17	.18
Transparent, cs ....lb.	...	.20	...	.20	...	.20
Cellulose, Acetate, 50 lb kgs ....lb.	.55	.60	.55	.60	.55	.60
Chalk, dropped, 175 lb bbls lb.	.03	.03¾	.03	.03¾	.03	.03¾
Precip, heavy, 560 lb cks lb.	.03	.04	.03	.04	.03	.04
Light, 250 lb cks ....lb.	.03	.04	.03	.04	.03	.04
Charcoal, Hardwood, lump, blk, wks ....bu.	...	.15	...	.15	...	.15
Willow, powd, 100 lb bbl, wks ....lb.	.06	.06¼	.06	.06¼	.06	.06¼
bgs, delv* ....ton	24.40	25.40	24.40	25.40	22.40	30.00
Chestnut, clarified bbls, wks lb.	...	.01⅞	...	.01⅞	...	.01⅞
25%, tks, wks ....lb.	...	.01½	...	.01½	...	.01½
Pwd, 60%, 100 lb bgs. wks ....lb.	...	.04⅞	...	.04⅞	...	.04⅞
China Clay, c-l, blk mines ton	...	7.00	...	7.00	...	7.00
Powdered, bbls ....lb.	.01	.02	.01	.02	.01	.02
Pulverized, bbls, wks ..ton	10.00	12.00	10.00	12.00	10.00	12.00
Imported, lump, blk ...ton	15.00	25.00	15.00	25.00	15.00	25.00
Chlorine, cyls, lcl, wks, contract ....lb.	.07½	.08½	.07½	.08½	.07½	.08½
cyls, c-l, contract ...lb. *j*	...	.05½	...	.05½	...	.05½
Liq, tk, wks, contract 100 lb.	...	2.15	...	2.15	2.00	2.15
Multi, c-l, cyls, wks, cont ....lb.	2.30	2.55	2.30	2.55	2.30	2.40
Chloroacetophenone, tins, wks ....lb.	...	2.00	...	2.00	...	2.00
Chlorobenzene, Mono, 100 lb drs, lcl, wks ....lb.	.06	.07½	.06	.07½	.06	.07½
Chloroform, tech, 1000 lb drs ....lb.	.20	.21	.20	.21	.20	.21
USP, 25 lb tins ....lb.	.30	.31	.30	.31	.30	.31
Chloropicrin; comml cyls..lb.	.85	.90	.85	.90	.85	.90
Chrome, Green, CP ......lb.	.17	.18½	.17	.18½	.17	.30
Yellow ....lb.	.11	.12	.11	.12	.11	.16
Chromium, Acetate, 8% Chrome, bbls ....lb.	.06	.08	.06	.08	.05	.05¾
20° soln, 400 lb bbls ...lb.	...	.05½	...	.05½	...	.05½
Fluoride, powd, 400 lb bbl ....lb.	.27	.28	.27	.28	.27	.28

j A delivered price; * Depends upon point of delivery.

Current

Coal Tar
Diphenylguanidine

	Current Market		1936 Low	1936 High	1935 Low	1935 High
Coal tar, bbls ....bbl.	7.25	9.00	7.25	9.00	7.25	9.00
Cobalt Acetate, bbls ......lb.	..	.58	.58	.60	...	.60
Carbonate tech, bbls ....lb.	1.35	1.40	1.35	1.40	1.35	1.40
Hydrate, bbls ....lb.	1.66	1.76	1.66	1.76	1.66	1.76
Linoleate, paste, bbls ...lb.	...	.30	...	.30	...	.30
Resinate, fused, bbls ...lb.	...	.12½	...	.12½	...	.12½
Precipitated, bbls ......lb.	...	.32	...	.32	...	.32
Cobalt Oxide, black, bgs ..lb.	1.39	1.49	1.39	1.49	1.25	1.49
Cochineal, gray or bk bgs..lb.	.32	.36	.32	.36	.32	.39
Teneriffe silver, bgs ....lb.	.33	.37	.33	.37	.33	.40
Copper, metal, electrol 100 lb.	...	9.50	....	9.50	8.00	9.25
Carbonate, 400 lb bbls ..lb.	...	.08¼	...	.08¼	...	.08¼
52-54% bbls ....lb.	.14½	.16¼	.14½	.16¼	.14½	.16¼
Chloride, 250 lb bbls ...lb.	.17	.18	.17	.18	.17	.18
Cyanide, 100 lb drs ....lb.	.37	.38	.37	.38	.37	.38
Oleate, precip, bbls .....lb.	...	.20	...	.20	...	.20
Oxide, red, 100 lb bbls..lb.	.14	.15	.14	.15	.15	.17
black bbls, wks ......lb.	.14½	.15	.14½	.15	.14	.16½
Resinate, precip, bbls ...lb.	.18	.19	.18	.19	.18	.19
Stearate, precip, bbls .. lb.	.35	.40	.35	.40	.35	.40
Sub-acetate verdigris, 400 lb bbls ....lb.	.18	.19	.18	.19	.18	.19
Sulfate, bbls, c-l, wks 100 lb.	...	3.85	...	3.85	...	3.85
Copperas, crys and sugar bulk c-l, wks, bgs ....ton	13.00	14.00	13.00	14.00	12.00	14.00
Corn Syrup, 42 deg, bbls ....100 lb.	...	3.15	3.05	3.15	3.18	3.63
43 deg, bbls .....100 lb.	...	3.20	3.10	3.20	3.23	3.68
Corn Sugar, tanners, bbls ....100 lb.	...	3.18	3.08	3.18	3.46	3.66
Cotton, Soluble, wet, 100 lb bbls ....lb.	.40	.42	.40	.42	.40	.42
Cream Tartar, USP, powd & gran, 300 lb bbls .....lb.	...	.16¾	...	.16¾	.16¼	.17¼
Creosote, USP, 42 lb cbys lb.	.45	.47	.45	.47	.45	.47
Oil, Grade 1, tks ......gal.	.12½	.13½	.12½	.13½	.11½	.13½
Grade 2 ....gal.	.109	.12	.109	.12	.10½	.12
Cresol, USP, drs ....lb.	.10	.10½	.10	.10½	.10	.11½
Crotonaldehyde, 98%, 50 gal drs ....lb.	.26	.30	.26	.30	.32	.36
Cudbear, English .. ..lb.	.19	.25	.19	.25	.19	.25
Cutch, Philippine, 100 lb bale ....lb.	.04	.04¾	.04	.04¾	.03½	.04¾
Cyanamid, bgs, c-l, frt allowed Ammonia unit	...	1.07½	...	1.07½	...	1.07½
Dextrin, corn, 140 lb bgs f.o.b., Chicago ...100 lb.	3.55	3.75	3.45	3.75	3.60	4.15
British Gum, bgs ...100 lb.	3.80	4.10	3.70	4.10	3.85	4.50
White, 140 lb bgs ..100 lb.	3.50	3.70	3.40	3.70	3.50	4.10
Potato, Yellow, 220 lb bgs lb.	.07¾	.08¾	.07¾	.08¾	.07¾	.08¾
White, 220 lb bgs, lcl ...lb.	.08	.09	.08	.09	.08	.09
Tapioca, 200 bgs, lcl ....lb.	...	.08	...	.08	.08	.08¾
Diamylamine, drs, wks ...lb.	...	1.00	...	1.00	...	1.00
Diamylene, drs, wks ......lb.	.095	.102	.095	.102	.095	.102
tks, wks ....lb.	...	.08½	...	.08½	...	.08½
Diamylether, wks, drs ....lb.	.085	.092	.085	.092	.085	.092
tks, wks ....lb.	...	.075	...	.075	...	.075
Diamylphthalate, drs wks gal.	.18	.19½	.18	.19½	.18	.20½
Diamyl Sulfide, drs, wks ..lb.	...	1.10	...	1.10	...	1.10
Dianisidine, bbls ....lb.	2.25	2.45	2.25	2.45	2.25	2.45
Dibutylphthalate, drs, wks lb.	.20	.21	.20	.21	.20	.23
Dibutyltartrate, 50 gal drs lb.	.35	.40	.35	.40	.35	.40
Dichlorethylene, drs .....gal.	.29	...	.29	...	.29	...
Dichloroethylether, 50 gal drs, wks ....lb.	.16	.17	.16	.17	.16	.17
tks, wks ....lb.	...	.15	...	.15	...	.15
Dichloromethane, drs, wks lb.	...	.23	...	.23	.15	.23
Dichloropentanes, drs, wks lb.	.032	.040	.032	.040	.032	.040
tks, wks ....lb.	...	.02½	...	.02½	...	.02½
Diethanolamine, tks ......lb.	..	.30	...	.30	...	...
Diethylamine, 400 lb drs ..lb.	2.75	3.00	2.75	3.00	2.75	3.00
Diethyl Carbinol, drs .....lb.	.60	.75	.60	.75	.60	.75
Diethylcarbonate, com'drs lb.	.31⅜	.35	.31⅜	.35	.31⅜	.35
90% grade, drs ....lb.	...	.25	...	.25	...	.25
Diethylaniline, 850 lb drs..lb.	.52	.55	.52	.55	.52	.55
Diethylorthotoluidin, drs ..lb.	.64	.67	.64	.67	.64	.67
Diethyl phthalate, 1000 lb drs ....lb.	.18½	.19	.18½	.19	.18½	.27
Diethylsulfate, tech, 50 gal drs ....lb.	...	...	...	...	...	...
Diethyleneglycol, drs .... lb.	.15½	.17½	.15½	.17½	.15½	.17½
Mono ethyl ethers, drs..lb.	.15	.17	.15	.17	.15	.17
tks, wks ....lb.	...	.15	...	.15	...	.15
Mono butyl ether, drs ..lb.	...	.26	...	.26	...	.26
Diethylene oxide, 50 gal drs, wks ....lb.	.20	.24	.20	.24	.20	.27
Diglycol Oleate, bbls .... lb.	...	.24	...	.24	.16	.24
Dimethylamine, 400 lb drs, pure 25 & 40% sol 100% basis ....lb.	...	.95	...	.95	...	.95
Dimethylaniline, 340 lb drs lb.	.29	.30	.29	.30	.29	.30
Dimethyl Ethyl Carbinol, drs ....lb.	.60	.75	.60	.75	.60	.75
Dimethyl phthalate, drs ...lb.	.20	.21½	.20	.21½	.20½	.24½
Dimethysulfate, 100 lb drs lb.	.45	.50	.45	.50	.45	.50
Dinitrobenzene, 400 lb bbls ....lb. k	.17	.19½	.17	.19½	.17	.19½
Dinitrochlorobenzene, 400 lb bbls ....lb.	.14	.15½	.14	.15½	.14	.15½
Dinitronaphthalene, 350 lb bbls ....lb.	.34	.37	.34	.37	.34	.37
Dinitrophenol, 350 lb bbls lb.	.23	.24	.23	.24	.23	.24
Dinitrotoluene, 300 lb bbls lb.	.15½	.16½	.15½	.16½	.15½	.16½
Diphenyl ....lb.	.15	.25	[illegible]	.25	.15	.25
Diphenylamine ....lb.	.31	.32	...	32	.31	.32
Diphenylguanidine, 100 lb bbl ....lb.	.35	.37	.35	.37	.36	.37

k Higher price is for purified material.

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Prices

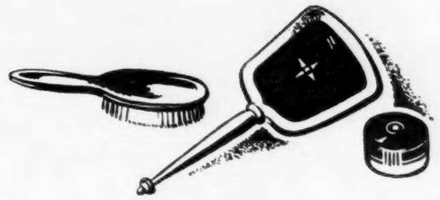
	Current	Market	1936 Low	1936 High	1935 Low	1935 High
Dip Oil, see Tar Acid Oil.						
Divi Divi pods, bgs shipmt ton	34.00	36.00	34.00	36.00	36.00	40.00
Extract ....lb.	.05	.05½	.05	.05½	.05	.05½
Egg Yolk, dom., 200 lb cases ....lb.	...	.63	...	.63	.46	.63
Imported ....lb.	.51	.53	.51	.56	...	...
Epsom Salt, tech, 300 lb bbls c-l NY ....100 lb.	1.80	2.00	1.80	2.00	1.80	2.25
USP, c-l, bbls .....100 lb.	...	2.00	...	2.00	2.00	2.25
Ether, USP anaesthesia 55 lb drs ....lb.	.22	.23	.22	.23	.22	.23
(Conc) ....lb.	.09	.10	.09	.10	.09	.10
Ether, Isopropyl 50 gal drs lb.	.07	.08	.07	.08	.07	.08
tks, frt allowed ......lb.	...	.06	...	.06	...	.06
Nitrous, conc, bottles ...lb.	.75	.77	.75	.77	.75	.77
Synthetic, wks, drs ....lb.	.08	.09	.08	.09	.08	.09
Ethyl Acetate, 85% Ester tks ....lb.	.07½	.08	.07½	.08	.07½	.08
drs ....lb.	.08½	.09	.08½	.09	.08½	.09
Anhydrous, tks ....lb.	...	.08½	...	.08½	...	.08½
drs ....lb.	.09½	.10	.09½	.10	.09½	.10
Acetoacetate, 50 gal drs lb.	.65	.68	.65	.68	.65	.68
Benzylaniline, 300 lb drs lb.	.88	.90	.88	.90	.88	.90
Bromide, tech, drs .....lb.	.50	.55	.50	.55	.50	.55
Chloride, 200 lb drs ....lb.	.22	.24	.22	.24	.22	.24
Chlorocarbonate cbys ...lb.	...	.30	...	.30	...	.30
Crotonate, drs ....lb.	1.00	1.25	1.00	1.25	1.00	1.25
Ether, Absolute, 50 gal drs ....lb.	.50	.52	.50	.52	.50	.52
Lactate, drs, wks ......lb.	.25	.29	.25	.29	.25	.29
Methyl Ketone, 50 gal drs, frt allowed ....lb.	.08½	.09	.08½	.09	.08½	.09
tks, frt allowed ......lb.	...	.07½	...	.07½	...	.07½
Oxalate, drs, wks ......lb.	.37½	.55	.37½	.55	.37½	.55
Oxybutyrate, 50 gal drs, wks ....lb.	.30	.30½	.30	.30½	.30	.30½
Ethylene Dibromide, 60 lb drs ....lb.	.65	.70	.65	.70	.65	.70
Chlorhydrin, 40%, 10 gal cbys chloro, cont .....lb.	.75	.85	.75	.85	.75	.85
Anhydrous ....lb.	...	.75	...	.75	...	...
Dichloride, 50 gal drs ..lb.	.0545	.0994	.0545	.0994	.0545	.0994
Glycol, 50 gal drs, wks lb.	.17	.21	.17	.21	.17	.28
tks, wks ....lb.	...	.16	...	.16	...	...
Mono Butyl Ether, drs. wks ....lb.	.20	.21	.20	.21	.20	.21
tks, wks ....lb.	...	.19	...	.19	...	.19
Mono Ethyl Ether, drs, wks ....lb.	.16	.17	.16	.17	.16	.17
tks, wks ....lb.	...	.15	...	.15	...	.15
Mono Ethyl Ether Acetate, drs, wks ......lb.	.17½	.18½	.17½	.18½	.17½	.18½
tks, wks ....lb.	...	.16½	...	.16½	...	.16½
Mono, Methyl Ether, drs wks ....lb.	.19	.23	.19	.23	.19	.23
tks, wks ....lb.	...	.18	...	.18	...	...
Stearate	.18	.18	.18	.18	.18	.18
Oxide, cyl ....lb.	.55	.60	.55	.60	.55	.75
Ethylidenaniline ....lb.	.45	.47½	.45	.47½	.45	.47½
Feldspar, blk pottery ....ton	...	14.50	...	14.50	...	14.50
Powd, blk, wks ....ton	14.00	14.50	14.00	14.50	14.00	14.50
Ferric Chloride, tech, crys, 475 lb bbls ....lb.	.05	.07½	.05	.07½	.05	.07½
sol, 42° cbys ....lb.	.06¼	.06½	.06¼	.06½	.06¼	.06½
Fish Scrap, dried, unground, wks ....unit *l*	...	nom.	...	nom.	2.25	2.90
Acid, Bulk, 6 & 3%, delv Norfolk & Baltimore basis ....unit *m*	...	2.25	...	2.25	2.00	2.35
Fluorspar, 98%, bgs .....lb.	30.00	35.50	30.00	35.50	28.00	35.50
Formaldehyde, USP, 400 lb bbls, wks ....lb.	.06	.07	.06	.07	.06	.07
Fossil Flour ....lb.	.02½	.04	.02½	.04	.02½	.04
Fullers Earth, blk, mines ....ton	6.50	15.00	6.50	15.00	6.50	15.00
Imp powd, c-l, bgs ....ton	23.00	30.00	23.00	30.00	23.00	30.00
Furfural (tech) drs, wks..lb.	.10	.15	.10	.15	.10	.15
Furfuramide (tech) 100 lb drs ....lb.	...	.30	...	.30	...	.30
Fusel Oil, 10% impurities lb.	.16	.18	.16	.18	.16	.18
Fustic, chips ....lb.	.04	.05	.04	.05	.04	.05
Crystals, 100 lb boxes...lb.	.20	.23	.20	.23	.20	.23
Liquid 50°, 600 lb bbls..lb.	.08½	.12	.08½	.12	.08½	.12
Solid, 50 lb boxes.......lb.	.16	.18	.16	.18	.16	.18
Sticks ....ton	25.00	26.00	25.00	26.00	25.00	26.00
G Salt paste, 360 lb bbls...lb.	.45	.47	.45	.47	.42	.43
Gall Extract ....lb.	.18	.20	.18	.20	.18	.20
Gambier, com 200 lb bgs..lb.	...	.06	...	.06	.05	.08
Singapore cubes, 150 lb bgs ....100 lb.	.08	.09	.08	.09	.07⅛	.09⅛
Gelatin, tech, 100 lb cs ...lb.	.50	.55	.50	.55	.50	.55
Glauber's Salt, tech, c-l, wks ....100 lb.	1.10	1.30	1.10	1.30	1.10	1.30
Anhydrous, see Sodium Sulfate.						
Glucose (grape sugar) dry 70-80° bgs, c-l, NY ..100 lb.	3.24	3.34	3.24	3.34	3.24	3.34
Tanner's Special, 100 lb bgs ....100 lb.	...	2.33	...	2.33	...	2.33
Glue, bone, com grades, c-l bgs ....lb.	.10½	.17½	.10½	.17½	...	...
Better grades, c-l, bgs lb.	.12	.17½	.12	.17½	...	...
Casein, kgs ....lb.	.18	.22	.18	.22	.18	.22
Glycerin, CP, 550 lb drs ..lb.	.16	.17	.16	.17	.14	.14½
Dynamite, 100 lb drs ...lb.	.13¾	.14¼	.13¾	.14¼	.13¾	.14¼
Saponification, drs .....lb.	.10¼	.11½	.10¼	.11½	.10	.11½
Soap Lye, drs ....lb.	.09¼	.09½	.09¼	.09½	.09	.10

l + 10; *m* + 50.

Current

Glyceryl Phthalate
Gum, Yacca

	Current Market		1936 Low	1936 High	1935 Low	1935 High
Glyceryl Phthalate ....lb.	...	.28	...	.28	...	.28
Glyceryl Stearate, bbls....lb.	...	.18	...	.18	...	.18
Glycol Phthalate ....lb.	...	.29	...	.29	.28	.29
Glycol Stearate ....lb.	...	.23	...	.23	.18	.23
Graphite:						
Crystalline, 500 lb bbls ....lb.	.04	.05	.04	.05	.04	.05
Flake, 500 lb. bbls .....lb.	.08	.16	.08	.16	.08	.16
Amorphous, bbls ....lb.	.03	.04	.03	.04	.03	.04
GUMS						
Gum Aloes, Barbadoes ....lb.	.85	.90	.85	.90	.85	.90
Arabic, amber sorts ......lb.	.10¼	.10¾	.10¼	.10¾	.09½	.15
White sorts, No. 1, bgs ....lb.	.25	.27	.25	.27	.21	.27
No. 2, bgs ....lb.	.24	.26	.24	.26	.19	.26
Powd, bbls ....lb.	.13¼	.13¾	.13¼	.13¾	.13¼	.18
Asphaltum, Barbadoes (Manjak) 200 lb bgs, f.o.b., NY ....lb.	.02½	.10½	.02½	.10½	.02½	.10½
Egyptian, 200 lb cases, f.o.b., NY ....lb.	.12	.15	.12	.15	.12	.15
California, f.o.b., NY, drs ....ton	29.00	55.00	29.00	55.00	29.00	55.00
Benzoin Sumatra, USP, 120 lb cases ....lb.	.18	.19	.18	.19	.19	.28
Copal, Congo, 112 lb bgs, clean, opaque ....lb.	.19½	.20	.19½	.20	.19½	.24⅝
Dark amber ....lb.	.07½	.08	.07½	.08	.07¼	.09¼
Light amber ....lb.	.13⅝	.14⅛	.13⅝	.14⅛	.11½	.14⅞
Copal, East India, 180 lb bgs						
Macassar pale bold ....lb.	.13⅜	.14	.13⅜	.14	.09½	.10¾
Chips ....lb.	.06⅛	.06½	.06⅛	.06½	.05½	.06
Nubs ....lb.	...	.10⅞	...	.10⅞	...	...
Dust ....lb.	.03⅝	.04⅛	.03⅝	.04⅛	.03⅝	.04½
Singapore						
Bold ....lb.	.16⅜	.16⅞	.16⅜	.16⅞	.12⅛	.17
Chips ....lb.	.04¾	.05¼	.04¾	.05¼	.04⅝	.05⅝
Nubs ....lb.	.10⅜	.11¼	.10⅜	.11¼	.10	.11¾
Dust ....lb.	.03⅝	.04⅛	.03⅝	.04⅛	.03⅝	.05½
Copal Manilla, 180-190 lb baskets, Loba A .....lb.	.12½	.13	.12½	.13	.11¾	.13
Loba B ....lb.	.11⅛	.12	.11⅛	.12	.10¼	.12
Loba C ....lb.	.10⅝	.11⅛	.10⅝	.11⅛	.10⅛	.11½
MA sorts ....lb.	.07⅛	.07⅝	.07⅛	.07⅝	.06	.07⅝
DBB ....lb.	.08⅜	.08⅞	.08⅜	.08⅞	.08	.09
Dust ....lb.	.05⅝	.06⅛	.05⅝	.06⅛	.04⅞	.06⅛
Copal Pontianak, 224 lb cases, bold genuine ....lb.	.15½	.16	.15½	.16	.14⅜	.16⅝
Mixed ....lb.	.13¼	.13¾	.13¼	.13¾	.12⅞	.14⅞
Chips ....lb.	.07⅜	.07⅞	.07	.07⅞	.06⅞	.08¼
Nubs ....lb.	.10¼	.10½	.10¼	.10½	.09⅝	.11¾
Split ....lb.	.12⅞	.13	.12⅞	.13	.12⅜	.13⅞
Dammar Batavia, 136 lb cases						
A ....lb.	.21¾	.22¼	.21⅜	.22¼	.19	.21⅞
B ....lb.	.20¾	.21½	.20⅜	.21½	.18	.20⅞
C ....lb.	.17⅛	.17⅝	.16½	.17⅝	.16	.17
D ....lb.	.14¼	.14⅜	.13⅝	.14⅜	.11¾	.14⅛
A/D ....lb.	.16¼	.17	.15½	.17	.14	.16
A/E ....lb.	.13⅝	.14¼	.13	.14¼	.11¾	.13¾
E ....lb.	.06¾	.07¼	.06¾	.07¼	.07	.07¼
F ....lb.	.06⅜	.06⅞	.06⅜	.06⅞	.06⅛	.06⅞
Singapore						
No. 1 ....lb.	.17	.17½	.17	.17½	.15⅝	.19
No. 2 ....lb.	.13¾	.14¼	.13¾	.14¼	.10⅝	.14⅞
No. 3 ....lb.	.05¼	.05¾	.05¼	.05¾	.04⅝	.05⅞
Chips ....lb.	.09¾	.09¾	.09¾	.09¾	.08⅞	.09¾
Dust ....lb.	.05⅛	.05⅝	.05⅛	.05⅝	.04¾	.05⅞
Seeds ....lb.	.06⅝	.06¾	.06⅝	.06¾	.04¾	.07¼
Ester ....lb.	.07⅝	.08⅜	.07⅝	.08⅜	.07¼	.08⅜
Elemi, cons ....lb.	.09¾	.10¼	.09¾	.10¼	...	...
Gamboge, pipe, cases .....lb.	.58	.59	.58	.59	,55	.65
Powd, bbls ....lb.	.65	.66	.65	.66	.65	.75
Ghatti, sol. bgs ....lb.	.11	.15	.11	.15	.09	.15
Karaya, powd, bbls, xxx..lb.	.24	.25	.24	.25	.23	.25
xx ....lb.	.16	.17	.16	.17	.15	.17
No. 1 ....lb.	.09½	.10	.09½	.10	.08	.10
No. 2 ....lb.	.08½	.09	.08½	.09	.07	.09
Kauri, NY, San Francisco, Brown XXX, cases ....lb.	.60	.60½	.60	.60½	.60	.60½
BX ....lb.	.33	.33½	.33	.33½	.33	.33½
B1 ....lb.	.19	.19½	.19	.19½	.19	.19½
B2 ....lb.	.14½	.15	.14½	.15	.14½	.15
B3 ....lb.	.12	.12½	.12	.12½	.12	.12½
Pale XXX ....lb.	.65	.65½	.65	.65½	.65	.65½
No. 1 ....lb.	.40	.40½	.40	.40½	.40	.40½
No. 2 ....lb.	.22	.22½	.22	.22½	.22	.22½
No. 3 ....lb.	.15	.15½	.15	.15½	.15	.15½
Kino, tins ....lb.	.70	.80	.70	.80	.70	.80
Mastic ....lb.	.60	.60½	.60	.60½	.46	.60½
Sandarac, prime quality, 200 lb bgs & 300 lb cks ...lb.	.26¼	.26½	.26¼	.26½	.26¼	.35½
Senegal, picked bgs ......lb.	.20	.21	.20	.21	.20	.21
Sorts ....lb.	.11½	.12½	.11½	.12½	.09⅜	.12½
Thus, bbls ....280 lbs.	...	11.00	...	11.00	10.50	11.00
Strained ....280 lbs.	...	11.00	...	11.00	10.50	11.00
Tragacanth, No. 1, cases ....lb.	1.20	1.25	1.20	1.25	1.15	1.30
No. 2 ....lb.	1.10	1.15	1.10	1.15	1.05	1.20
No. 3 ....lb.	.95	1.00	.95	1.00	.95	1.05
No. 4 ....lb.	.85	.90	.85	.90	.85	.95
No. 5 ....lb.	.75	.80	.75	.80	.75	.85
No. 6, bgs ....lb.	.18	.19	.18	.19	.14	.19
Sorts, bgs ....lb.	...	.25	...	.25	.11	.25
Yacca, bgs ....lb.	.03¼	.03¾	.03¼	.03¾	.03¼	.03¾



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Sodium Sulphide
Tartar Emetic
Tertiary Butyl Alcohol

	Current Market		1936 Low	1936 High	1935 Low	1935 High
Helium, cyl (200 cu. ft.) cyl.	...	25.00	...	25.00	...	25.00
Hematite crystals, 400 lb bbls ....lb.	.16	.18	.16	.18	.16	.18
Paste, 500 bbls ....lb.	...	.11	...	.11	...	.11
Hemlock, 25%, 600 lb bbls, wks ....lb.	...	.02⅞	...	.02⅞	...	.02⅞
tks ....lb.	...	.02½	...	.02½	...	.02½
Hexalene, 50 gal drs, wks lb.	...	.30	...	.30	...	.30
Hexane, normal 60-70°C. Group 3, tks ....gal.	...	.12	...	.12	...	.14
Hexamethylenetetramine, drs ....lb.	.37	.39	.37	.39	.37	.39
Hexyl Acetate, delv, drs ..lb.	.12	.12½	.12	.12½	.12	.12½
tks ....lb.	...	.11½	...	.11½	...	.11½
Hoof Meal, f.o.b. Chicago unit	...	2.50	...	2.50	2.50	2.70
Hydrogen Peroxide, 100 vol, 140 lb cbys ....lb.	.20	.21	.20	.21	.20	.21
Hydroxyamine Hydrochloride ....lb.	...	3.15	...	3.15	...	3.15
Hypernic, 51°, 600 lb bbls lb.	.17	.20	.17	.20	.17	.20
Indigo, Madras, bbls ....lb.	1.25	1.30	1.25	1.30	1.25	1.30
20% paste, drs ....lb.	.15	.18	.15	.18	.15	.18
Synthetic, liquid ....lb.	.13	.14	.13	.14	...	.12
Iodine, Resublimed, kgs...lb.	1.65	1.75	1.65	1.75	...	1.90
Irish Moss, ord, bales ....lb.	.09	.10	.09	.10	.09	.10
Bleached, prime, bales ..lb.	.18	.19	.18	.19	.18	.19
Iron Acetate Liq. 17°, bbls lb.	.03	.04	.03	.04	.03	.04
Chloride see Ferric Chloride.						
Nitrate, coml, bbls ..100 lb.	2.75	3.25	2.75	3.25	2.75	3.25
Oxide, English ....lb.	.07½	08¾	.07½	.08¾	.07½	.08¾
Isobutyl Carbinol (128-132°C) drs, wks ....lb.	.33	.34	.33	.34	.33	.34
tks, wks ....lb.	...	.32	...	.32	...	.32
Isopropyl Acetate, tks ....lb.	...	.07½	...	.07½	...	.07½
drs, frt allowed ....lb.	.08½	.09	.08½	.09	.08½	.09
Ether, see Ether, isopropyl.						
Keiselguhr, 95 lb bgs, NY, Brown ....ton	60.00	70.00	60.00	70.00	60.00	70.00
Lead Acetate, brown, broken, f.o.b. NY, bbls ....lb.	...	.09½	...	.09½	...	.09½
White, broken, bbls ....lb.	...	.11	...	.11	...	.11
cryst, bbls ....lb.	...	.10½	...	.10½	...	.10½
gran, bbls ....lb.	...	.11	...	.11	...	.11
powd, bbls ....lb.	...	.11¼	...	.11¼	...	.11¼
Arsenate, East, jobbers, drs ....lb.	.09	.09⅜	.09	.09⅜	.09	.09½
Dealers, drs ....lb.	.09¼	.10¾	.09¼	.10¾	.09¼	.10¾
West, jobbers, drs ....lb.	...	.09	...	.09	...	.09
dealers, drs ....lb.	...	.10	...	.10	...	.10
Linoleate, solid, bbls ....lb.	.26	.26½	.26	.26½	.26	.26½
Metal, c-l, NY ....100 lb.	...	4.60	4.50	4.60	3.50	4.50
Red, dry, 95% Pb_2O_4, delv ....lb.	.0735	...	.07	.08	.06	.08
97% Pb_2O_4, delv ....lb.	.0760	...	.07¼	.08¼	.06¼	.08¼
98% Pb_2O_4, delv ....lb.	...	.0810	.07½	.08½	.06½	.08½
Nitrate, 500 lb bbls, wks..lb.	.09	.09½	.09	.09½	.10	.14
Oleate, bbls ....lb.	.15	.16	.15	.16	.15	.16
Resinate, precip, bbls ..lb.	...	.14	...	.14	...	.14
Stearate, bbls ....lb.	.22	.23	.22	.23	.22	.23
White, 500 lb bbls, wks..lb.	.06½	.07	.06½	.07	.06½	.07
Sulfate, 500 lb bbls, wks lb.	...	.06	...	.06	...	.06
Lime, chemical quicklime, f.o.b., wks, bulk ....ton	7.00	7.25	7.00	7.25	7.00	7.25
Hydrated, f.o.b., wks ..ton	8.50	12.00	8.50	12.00	8.50	12.00
Lime Salts, see Calcium Salts.						
Lime sulfur, dealers, tks..gal.	...	.11	...	.11	.10½	.11
drs ....gal.	.13	.16	.13	.16	.13	.16½
Dry, bgs, jobbers....lb.	.07¼	.10¼	.07¼	.10¼	...	...
Linseed Meal, bgs ....ton	...	30.00	...	30.00	25.50	40.00
Litharge, coml, delv, bbls..lb.	.0610	.07	.06	.07	.05	.07
Lithopone, dom, ordinary, delv, bgs ....lb.	.04½	.04¾	.04½	.04¾	.04½	.04¾
bbls ....lb.	.04¾	.05	.04¾	.05	.04¾	.05
High strength, bgs ....lb.	.06	.06¼	.06	.06¼	.06	.06¼
bbls ....lb.	.06¼	.06½	.06¼	.06½	.06¼	.06½
Titanated, bgs ....lb.	.06	.06¼	.06	.06¼	.06	.06¼
bbls ....lb.	.06¼	.06½	.06¼	,06½	.06¼	.06½
Logwood, 51°, 600 lb bbls lb.	.08½	.10½	.08½	.10½	.08½	.10½
Solid, 50 lb boxes ....lb.	.13½	.17½	.13½	.17½	.13½	.17½
Sticks ....ton	24.00	26.00	24.00	26.00	24.00	26.00
Madder, Dutch ....lb.	.22	.25	.22	.25	.22	.25
Magnesite, calc, 500 lb bbl ton	60.00	65.00	60.00	65.00	60.00	65.00
Magnesium Carb, tech, 70 lb bgs, wks ....lb.	.06	.06½	.06	.06½	.06	.06½
Chloride flake, 375 lb drs, c-l, wks ....ton	36.00	39.00	36.00	39.00	36.00	39.00
Magnesium fluosilicate, crys, 400 lb bbls, wks ....lb.	.10	.10½	.10	.10½	.10	.10½
Oxide, USP, light, 100 lb bbls ....lb.	...	.42	...	.42	...	.42
Heavy, 250 lb bbls .. lb.	...	.50	...	.50	...	.50
Palmitate, bbls ....lb.	.23	.24	.23	.24	.22	.24
Stearate, bbls ....lb.	.20	.22	.20	.22	.19	.22
Linoleate, lig drs ....lb.	.18	.19	.18	.19	.18	.19
Resinate, fused, bbls ...lb.	.08¼	.08½	.08¼	.08½	.08¼	.08½
precip, bbls ....lb.	...	.12	...	.12	...	.12
Manganese Borate, 30%, 200 lb bbls ....lb.	.15	.16	.15	.16	.15	.16
Chloride, 600 lb cks ....lb.	.09	.12	.09	.12	.09	.12
Dioxide, tech (peroxide), paper bgs, c-l ....ton	...	47.50	...	47.50	45.00	50.00
Mangrove, 55%, 400 lb bbls lb.	...	.04	...	.04	...	.04
Bark, African ....ton	...	27.00	26.00	27.00	26.00	30.00
Marble Flour, blk ....ton	12.00	13.00	12.00	13.00	12.00	13.00
Mercuric chloride ....lb.	.81	.83	.81	.83	.71	.93
Mercury metal ...76 lb. flasks	77.00	80.00	77.00	80.00	69.00	77.00
Meta-nitro-aniline ....lb.	.67	.69	.67	.69	.67	.69
Meta-nitro-paratoluidine 200 lb bbls ....lb.	1.40	1.55	1.40	1.55	1.40	1.55

Current

Meta-phenylene-diamine
Orthodichlorobenzene

	Current Market		1936 Low	1936 High	1935 Low	1935 High
Meta-phenylene-diamine 300 lb bbls ....lb.	.80	.84	.80	.84	.80	.84
Peroxide, 100 lb cs .....lb.	1.20	1.25	1.20	1.25	1.20	1.25
Silicofluoride, bbls .....lb.	.09	.10	.09	.10	.09	.10
Stearate, bbls ....lb.	.19	.20	.19	.20	.19	.20
Meta-toluene-diamine, 300 lb bbls ....lb.	.67	.69	.67	.69	.67	.69
Methanol, 95%, frt allowed, drs ....gal. *o*	.37½	.58	.37½	.58	.37½	.58
tks, frt allowed ....gal. *o*	.33	.36½	.33	.36½	.33	.36½
97% frt allowed, drs gal. *o*	.38½	.59	.38½	.59	.38½	.59
tks, frt allowed ....gal. *o*	.34	.37½	.34	.37½	.34	.37½
Pure, frt allowed, drs gal. *o*	.40	.61	.40	.61	.40	.61
tks, frt allowed ....gal. *o*	.35½	.39	.35½	.39	.35½	.39
Synthetic, frt allowed, drs ....gal. *o*	.40	.61	.40	.61	.40	.61
tks, frt allowed ....gal. *o*	.35½	.39	.35½	.39	.35½	.39
Methyl Acetate, dom, 98-100%, drs ....lb.	.18	.18½	.18	.18½	.18	.18½
Synthetic, 410 lb drs ...lb.	.16	.17	.16	.17	.16	.17
tks ....lb.	...	.15	...	.15	...	.15
Acetone, frt allowed, drs ....gal. *p*	.49½	.68½	.49½	.68½	.49½	.73½
tks, frt allowed, drs gal. *p*	.44	...	.44	...	.44	.52½
Synthetic, frt allowed, east of Rocky M., drs gal. *p*	.57½	.60	.57½	.60	.57½	.60
tks, frt allowed....gal.	...	.53	...	.53	...	.53
West of Rocky M., frt allowed, drs ....gal. *p*	.60	.63	.60	.63	.60	.63
tks, frt allowed ..gal. *p*	...	.56	...	.56	...	.56
Hexyl Ketone, pure, drs lb.	...	.60	...	.60	...	.60
Anthraquinone ....lb.	.65	.67	.65	.67	.65	.67
Butyl Ketone, tks ......lb.	...	.10½	...	.10½	...	.10½
Chloride, 90 lb cyl .....lb.	...	.45	...	.45	...	.45
Ethyl Ketone, tks ......lb.	...	.07½	...	.07½	...	.07½
Propyl carbinol, drs ....lb.	.60	.75	.60	.75	.60	.75
Mica, dry grd, bgs, wks ..lb.	35.00	...	35.00	...	35.00	...
Michler's Ketone, kgs ....lb.	...	2.50	...	2.50	...	2.50
Molasses, blackstrap, tks, f.o.b. NY ....gal.	.08	.08¼	.08	.08¼	.07¾	.08¼
Monoamylamine, drs, wks lb.	...	1.00	...	1.00	...	1.00
Monochlorobenzene, see Chlorobenzene, mono.						
Monoethanolamine, tks, wks lb.	...	.30	...	.30	...	...
Monomethylparaminosulfate, 100 lb drs ....lb.	3.75	4.00	3.75	4.00	3.75	4.00
Myrobalans 25%, liq bbls..lb.	...	.04¼	...	.04¼	...	.04¼
50% Solid, 50 lb boxes lb.	.06	.06¼	.06	.06¼	.06	.06¼
J1 bgs ....ton	23.00	24.00	23.00	24.00	23.50	27.00
J2 bgs ....ton	...	14.50	...	14.50	15.00	15.75
R2 bgs ....ton	...	14.00	...	14.00	16.00	16.50
Naphtha, v.m.&p. (deodorized) see petroleum solvents.						
Naphtha, Solvent, water-white, tks ....gal.	...	.31	...	.31	.26	.30
drs, c-l ....gal.	...	.36	...	.36	.31	.35
Naphthalene, dom, crude, bgs, wks ....lb.	3.50	3.55	3.50	3.55	1.65	3.00
Imported, cif, bgs ....lb.	...	...	...	...	1.90	3.00
Dyestuffs, bgs, bbls, Eastern wks ....lb.	.06	.07	.06	.07	.04¼	.07
Balls, flakes, pks ......lb.	...	.07¼	...	.07¼	...	...
Balls, ref'd, bbls, Eastern wks ....lb.	...	.06¾	...	.06¾	.04½	.06¾
Flakes, ref'd, bbls, Eastern wks ....lb.	...	.06¾	...	.06¾	.04½	.06¾
Dyestuffs, bgs, bbls, Mid-West wks ....lb. *q*	.06½	.07½	.06½	.07½	.04¾	.07½
Balls, ref'd, bbls, Mid-West wks ....lb. *q*	...	.07¼	...	.07¼	.05	.07½
Flakes, ref'd, bbls, Mid-West wks ....lb. *q*	...	.07¼	...	.07¼	.05	.07¼
Nickel Carbonate, bbls....lb.	...	.36	...	.36	.35	.36
Chloride, bbls ....lb.	.18	.19	.18	.19	.18	.19
Oxide, 100 lb kgs, NY..lb	.35	.37	.35	.37	.35	.37
Salt, 400 lb bbls, NY ...lb.	.13	.13½	.13	.13½	.12½	.13½
Single, 400 lb bbls, NY lb.	.13	.13½	.13	.13½	.11½	.13½
Metal ingot ....lb.	...	.35	...	.35	...	.35
Nicotine, free 50%, 8 lb tins, cases ....lb.	8.25	10.15	8.25	10.15	8.25	10.15
Sulfate, 55 lb drs ......lb.	.75	1.17	.75	1.17	.67	.80
Nitre Cake, blk ....ton	12.00	14.00	12.00	14.00	12.00	14.00
Nitrobenzene, redistilled, 1000 lb drs, wks ....lb.	.09	.11	.09	.11	.09	.11
tks ....lb.	...	.08½	...	.08½	...	.08½
Nitrocellulose, c-l-l c-l, wks lb.	.29½	.34	.29½	.34	.27	.34
Nitrogenous Mat'l, bgs, imp unit	...	2.25	...	2.25	2.20	2.75
dom, Eastern wks ....unit	...	2.25	...	2.25	2.20	2.40
dom, Western wks ....unit	...	1.90	...	1.90	1.90	2.30
Nitronaphthalene, 550 lb bbls lb.	.24	.25	.24	.25	.24	.25
Nutgalls Aleppy, bgs .....lb.	.16	.18	.16	.18	.12	.18
Chinese, bgs ....lb.	.19	.20	.19	.20	.19	.20
Oak Bark Extract, 25%, bbls lb.	...	.03½	...	.03½	...	.03½
tks ....lb.	...	.02¾	...	.02¾	...	.02¾
Octyl Acetate, tks, wks ...lb.	...	.15	...	.15	...	...
Orange-Mineral, 1100 lb cks NY ....lb.	.10	.10½	.10	.10½	.09¼	.10½
Orthoaminophenol, 50 lb kgs.lb.	2.15	2.25	2.15	2.25	2.15	2.25
Orthoanisidine, 100 lb drs lb.	.82	.84	.82	.84	.82	.84
Orthochlorophenol, drs ....lb.	.50	.65	.50	.65	.50	.65
Orthocresol, drs ....lb.	.13	.15	.13	.15	.13	.15
Orthodichlorobenzene, 1000 lb drs ....lb.	.05½	.06	.05½	.06	.05½	.06

o Country is divided in 5 zones, prices varying by zone. In drum prices range covers both zone and c-l and lcl quantities in the 5 zones; in each case, bbl. prices are 2½c higher; synthetic is not shipped in bbls.; *p* Country is divided into 5 zones. Also see footnote directly above; *q* Naphthalene quoted on Pacific Coast F.A.S. Phila. or N. Y.

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ACTICARBONE

	Current Market		1936 Low	1936 High	1935 Low	1935 High
Orthonitrochlorobenzene, 1200 lb drs, wks ....lb.	.28	.29	.28	.29	.28	.29
Orthonitrotoluene, 1000 lb drs, wks ....lb.	.07	.10	.07	.10	.05½	.10
Orthonitrophenol, 350 lb drs ....lb.	.52	.80	.52	.80	.52	.80
Orthotoluidine, 350 lb bbls, l-c-l ....lb.	.14½	.15	.14½	.15	.14½	.15
Orthonitroparachlorphenol, tins ....lb.	.70	.75	.70	.75	.70	.75
Osage Orange, cryst .....lb.	.17	.25	.17	.25	.17	.25
51 deg liquid ....lb.	.07	.07¾	.07	.07¾	.07	.07¾
Powd, 100 lb bgs ......lb.	.14½	.15	.14½	.15	.14½	.15
Paraffin, rfd, 200 lb cs slabs						
122-127 deg M P ......lb.	.0445	.04½	.0445	.04½	.04	.04¾
128-132 deg M P ......lb.	.04¾	.049	.04¾	.049	.05	.0515
133-137 deg M P ......lb.	.05½	.05¾	.05½	.05¾	.0575	.06
Para aldehyde, 110-55 gal drs ....lb.	.16	.18	.16	.18	.16	.18
Aminoacetanilid, 100 lb kgs ....lb.	...	.85	...	.85	...	.85
Aminohydrochloride, 100 lb kgs ....lb.	1.25	1.30	1.25	1.30	1.25	1.30
Aminophenol, 100 lb kgs lb.	...	1.05	...	1.05	...	1.05
Chlorophenol, drs ......lb.	.50	.65	.50	.65	.50	.65
Coumarone, 330 lb drs ..lb.	...	...	...	...	...	...
Cymene, refd, 110 gal dr ....gal.	2.25	2.50	2.25	2.50	2.25	2.50
Dichlorobenzene, 150 lb bbls wks ....lb.	.16	.20	.16	.20	.16	.20
Formaldehyde, bbls, wks lb.	.38	.39	.38	.39	.38	.39
Nitroacetanilid, 300 lb bbls ....lb.	.45	.52	.45	.52	.45	.52
Nitroaniline, 300 lb bbls, wks ....lb.	.47	.51	.47	.51	.48	.55
Nitrochlorobenzene, 1200 lb drs, wks ....lb.	.23½	.24	.23½	.24	.23½	.24
Nitro-orthotoluidine, 300 lb bbls ....lb.	2.75	2.85	2.75	2.85	2.75	2.85
Nitrophenol, 185 lb bbls lb.	.45	.50	.45	.50	.45	.50
Nitrosodimethylaniline, 120 lb bbls ....lb.	.92	.94	.92	.94	.92	.94
Nitrotoluene, 350 lb bbls lb.	.36	.37	.36	.37	.35	.37
Phenylenedamine, 350 lb bbls ....lb.	1.25	1.30	1.25	1.30	1.25	1.30
Para Tertiary amyl phenol, wks, drs ....lb.	.32	.50	.32	.50	.32	.50
Toluenesulfonamide, 175 lb bbls ....lb.	.70	.75	.70	.75	.70	.75
tks, wks ....lb.	...	.31	...	.31	...	.31
Toluenesulfonchloride, 410 lb bbls, wks ....lb.	.20	.22	.20	.22	.20	.22
Toluidine, 350 lb bbls, wks ....lb.	.58	.60	.58	.60	.56	.60
Paris Green, Arsenic Basis						
100 lb kgs ....lb.	...	.24	...	.24	...	.24
250 lb kgs ....lb.	...	.22	...	.22	...	.22
Perchlorethylene, 50 gal drs ....lb.	...	.15	...	.15	...	.15
Persian Berry Ext, bbls ..lb.	.55	Nom.	.55	Nom.	.55	Nom.
Pentane, normal, 28-38°C, group 3, tks.........gal.	...	.09	...	.09	...	.09
drs, group 3 ....gal.	.10	.15	.10	.15	.10	.15
Petrolatum, dark amber, bbls ....lb.	.02⅝	.02⅞	.02⅝	.02⅞	.02	.02⅞
Light, bbls ....lb.	.03⅛	.03⅜	.03⅛	.03⅜	.02½	.03⅜
Medium, bbls ....lb.	.02⅞	.03⅛	.02⅞	.03⅛	.02¼	.03⅛
Dark green, bbls ....lb.	.02½	.02¾	.02½	.02¾	.02½	.02¾
White, lily, bbls ....lb.	.06	.06¼	.06	.06¼	.05¼	.06½
White, snow, bbls ......lb.	.07	.07¼	.07	.07¼	.06¼	.07½
Red, bbls ....lb.	.02⅝	.02⅛	.02⅝	.02⅛	.02¼	.02⅞
Petroleum Ether, 30-60°, group 3, tks ....gal.	...	.13	...	.13	...	.13
drs, group 3 ....gal.	.15	.16	.15	.16	.15	.16

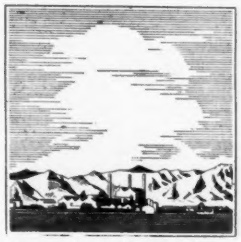
PETROLEUM SOLVENTS AND DILUENTS

	Current Market		1936 Low	1936 High	1935 Low	1935 High
Cleaners naphthas, group 3, tks, wks ....gal.	.07⅜	.07½	.07⅜	.07½	.06⅞	.07¼
Bayonne, tks, wks ..gal.	...	.09½	.09	.09½	...	.09
West Coast, tks ....gal.	...	.15	...	.15	...	.15
Hydrogenated, naphthas, frt allowed East, tks ....gal.	...	.16	...	.16	.15	.17½
No. 2, tks ....gal.	...	.18	...	.18	.18	.22½
No. 3, tks ....gal.	...	.15	...	.15	.15	.17½
No. 4, tks ....gal.	...	.18	...	.18	.18	.22½
Lacquer diluents, tks						
Bayonne ....gal.	.12	.12½	.12	.12½	.12	.12½
Group 3, tks ....gal.	.08⅜	.08½	.08⅜	.08½	.07⅞	.08
Naphtha, V.M.P., East, tks, wks ....gal.	...	.09	...	.09	...	.09
Group 3, tks, wks ...gal.	.07⅜	.07½	.07⅜	.07½	.06⅞	.07¼
Petroleum thinner, East, tks, wks ....gal.	...	.09½	.09	.09½	...	.09
Group 3, tks, wks ...gal.	.06⅜	.06⅝	.06⅜	.06⅝	.05⅞	.06¼
Rubber Solvents, stand grd, East, tks, wks ..... gal.	...	.09½	.09	.09½	...	.09
Group 3, tks, wks ..gal.	.07⅜	.07½	.07⅜	.07½	.06⅞	.07¼
Stoddard Solvent, East, tks, wks ....gal.	...	.09½	.09	.09½	...	.09
Group 3, tks, wks ...gal.	.06⅞	.07	.06⅞	.07	.06⅜	.07
Phenol, 250-100 lb drs ....lb.	.14¼	.15	.14¼	.15	.14¼	.15
Phenyl-Alpha-Naphthylamine, 100 lb kgs ....lb.	...	1.35	...	1.35	...	1.35
Phenyl Chloride, drs .....lb.	...	.16	...	.16	...	.16
Phenylhydrazine Hydrochloride ....lb.	2.90	3.00	2.90	3.00	2.90	3.00
Phloroglucinol, tech, tins ..lb.	15.00	16.50	15.00	16.50	15.00	16.50
CP, tins ....lb.	20.00	22.00	20.00	22.00	20.00	22.00

	Current Market		1936 Low	1936 High	1935 Low	1935 High
Phosphate Rock, f.o.b. mines						
Florida Pebble, 68% basis ....ton	...	1.85	...	1.85	1.85	3.40
70% basis ....ton	...	2.35	...	2.35	2.35	3.90
72% basis ....ton	...	2.85	...	2.85	2.85	4.40
75-74% basis ....ton	...	3.85	...	3.85	3.85	5.40
75% basis ....ton	...	4.35	...	4.35	4.35	5.50
Tennessee, 72% basis ..ton	...	4.50	...	4.50	4.50	4.75
Phosphorous Oxychloride 175 lb cyl ....lb.	.16	.20	.16	.20	.16	.20
Red, 110 lb cases ......lb.	.44	.45	.44	.45	.44	.45
Yellow, 110 lb cs, wks..lb.	.28	.33	.28	.33	.28	.33
Sesquisulfide, 100 lb cs..lb.	.38	.44	.38	.44	.38	.44
Trichloride, cyl ....lb.	.16	.20	.16	.20	.16	.20
Phthalic Anhydride, 100 lb drs, wks ....lb.	.14½	.15½	.14½	.15½	.14½	.15½
Pine Oil, 55 gal drs or bbls						
Destructive dist ....lb.	.44	.46	.44	.46	.44	.50
Steam dist wat wh bbls gal.	.64	.65	.64	.65	.64	.65
tks ....gal.	...	.59	...	.59	...	.59
Straw color, bbls ......gal.	...	.59	...	.59	...	.59
tks ....gal.	...	.54	...	.54	...	.54
Pitch Hardwood, wks ....ton	...	15.00	...	15.00	15.00	20.00
Burgundy, dom, bbls, wks ....lb.	...	.03½	...	.03½	...	.03½
Imported ....lb.	.11	.13	.11	.13	.11	.13
Coaltar, bbls, wks .....ton	...	19.00	...	19.00	...	19.00
Petroleum, see Asphaltum in Gums' Section.						
Pine, bbls ....bbl.	4.00	4.50	4.00	4.50	3.75	4.25
Stearin, drs ....lb.	.03	.04½	.03	.04½	.03	.04½
Platinum, refd ....oz.	34.50	38.00	34.50	38.00	35.00	38.00

POTASH

	Current Market		1936 Low	1936 High	1935 Low	1935 High
Potash, Caustic, wks, sol..lb.	.06¼	.06½	.06¼	.06½	.06¼	.06½
flake ....lb.	.07	.07⅜	.07	.07⅜	.07	.07⅜
Liquid, tks ....lb.	...	.02⅞	...	.02⅞	...	.02⅞
Potash Salts, Rough Kainit 14% basis ....ton	...	8.50	...	8.50	...	8.50
Manure Salts, imported						
20% basis, blk ....ton	...	11.00	...	11.00	8.60	11.00
30% basis, blk ....ton	...	14.40	...	14.40	12.90	14.40
Domestic, cif ports, blk unit	...	.43	...	.43	...	.43
Potassium Acetate ....lb.	.26	.28	.26	.28	.26	.28
Potassium Muriate, 80% basis bgs ....ton	...	22.50	...	22.50	22.00	22.50
Dom, blk ....unit	...	.45	...	.45	.40	.45
Pot & Mag Sulfate, 48% basis bgs ....ton	22.25	22.50	22.25	22.50	19.50	22.50
Potassium Sulfate, 90% basis bgs ....ton	...	33.75	...	33.75	33.75	35.00
Potassium Bicarbonate, USP 320 lb bbls ....lb.	.09	.18	.09	.18	.07½	.09
Bichromate Crystals, 725 lb cks ....lb.	.08½	.09	.08½	.09	.08⅛	.09
Binoxalate, 300 lb bbls..lb.	...	.23	...	.23	.22	.23
Bisulfate, 100 lb kgs ...lb.	.15½	.18	.15½	.18	.35	.36
Carbonate, 80-85% calc 800 lb cks ....lb.	.07¼	.07½	.07¼	.07½	.07½	.07⅞
liquid, tks ....lb.	...	.02⅞	...	.02⅞	...	...
drs, wks ....lb.	.03⅛	.03¼	.03⅛	.03¼	...	...
Chlorate crys, 112 lb kgs, wks ....lb.	.09¼	.09½	.09¼	.09½	...	.09¾
gran, kgs ....lb.	.12	.13	.12	.13	.12	.13
powd, kgs ....lb.	.08	.08¼	.08	.08¼	.08¾	.09¾
Chloride, crys, bbls ....lb.	.04	.04¾	.04	.04¾	.04	.04¾
Chromate, kgs ....lb.	.23	.28	.23	.28	.23	.28
Cyanide, 110 lb cases ..lb.	.55	.57½	.55	.57½	.55	.57½
Iodide, 75 lb bbls ......lb.	...	1.25	...	1.25	1.25	1.40
Metabisulfite, 300 lb bbls lb.	...	.15	...	.15	...	.15
Oxalate, bbls ....lb.	.25	.26	.25	.26	.16	.24
Perchlorate, cks, wks ...lb.	.09	.11	.09	.11	.09	.11
Permanganate, USP, crys, 500 & 1000 lb drs, wks lb.	.18½	.19½	.18½	.19½	.18½	.19½
Prussiate, red, 112 lb kgs lb.	.35	.38½	.35	.38½	.35	.38½
Yellow, 500 lb casks...lb.	.18	.19	.18	.19	.18	.19
Tartrate Neut, 100 lb kgs lb.	...	.21	...	.21	...	.21
Titanium Oxalate, 200 lb bbls ....lb.	.32	.35	.32	.35	.32	.35
Propane, group 3, tks ....lb.	...	.03	...	.03	...	.07
Pumice Stone, lump bgs ..lb.	.04½	.06	.04½	.06	.04½	.06
250 lb bbls ....lb.	.05	.07	.05	.07	.05	.07
Powd, 350 lb bgs ......lb.	.02½	.03	.02½	.03	.02½	.03
Putty, coml, tubs ..... 100 lb.	...	2.75	...	2.75	...	2.75
Linseed Oil, kgs ... 100 lb.	...	4.50	...	4.50	...	4.50
Pyridine, 50 gal drs .....gal.	...	1.30	...	1.30	1.20	1.30
Pyrites, Spanish cif Atlantic ports, blk ....unit	.12	.13	.12	.13	.12	.13
Pyrocatechin, CP, drs, tins ....lb.	2.40	2.75	2.40	2.75	2.40	3.00
Quebracho, 35% liq tks ...lb.	...	.02⅝	...	.02⅝	...	.02⅝
450 lb bbls, c-l ....lb.	...	.03⅛	...	.03⅛	...	.03⅛
Solid, 63%, 100 lb bales cif ....lb.	...	.03⅝	...	.03⅝	...	.03⅝
Clarified, 64%, bales..lb.	...	.03⅞	...	.03⅞	...	.03⅞
Quercitron, 51 deg liq, 450 lb bbls ....lb.	.06	.06½	.06	.06½	.06	.06½
Solid, 100 lb boxes .....lb.	.10	.12	.10	.12	.10	.12
R Salt, 250 lb bbls, wks ..lb.	.52	.57	.52	.57	.44	.45
Resorcinol tech, cans .....lb.	.75	.80	.75	.80	.75	.80
Rochelle Salt, cryst ......lb.	.14	.14½	.14	.14½	.14	.15
Powd, bbls ....lb.	.13	.13½	.13	.13½	.13	.13½
Rosin Oil, bbls, first run gal.	.41	.42	.41	.42	.36	.45
Second run ....gal.	.47	.50	.47	.50	.43	.48
Third run, drs ....gal.	.54	.56	.54	.56	.50	.60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	Current Market		1936 Low	1936 High	1935 Low	1935 High
Rosins 600 lb bbls, 280 lb unit ex. yard NY:						
B	...	4.55	4.55	4.65	4.65	5.65
D	...	5.15	4.95	5.15	5.02½	5.75
E	...	5.30	5.15	5.30	5.15	5.90
F	...	5.60	5.40	5.60	5.20	5.95
G	...	5.75	5.50	5.75	5.25	6.00
H	...	5.85	5.55	5.85	5.25	6.00
I	...	5.85	5.60	5.85	5.25	6.00
K	...	5.90	5.80	5.90	5.27½	6.05
M	...	5.95	5.80	5.95	5.35	6.10
N	...	6.02½	6.00	6.02½	5.75	6.40
WG	...	6.25	6.25	6.35	5.95	6.87½
WW	...	6.65	6.65	6.90	6.25	7.55
Rosins, Gum, Savannah (280 lb unit):						
B	...	3.30	3.30	3.40	3.40	4.40
D	...	3.90	3.75	3.90	3.70	4.50
E	...	4.05	3.90	4.05	3.90	4.65
F	...	4.36	4.10	4.36	3.95	4.70
G	...	4.45	4.20	4.45	4.00	4.75
H	...	4.60	4.30	4.60	4.00	4.75
I	...	4.60	4.40	4.60	4.00	4.75
K	...	4.65	4.55	4.65	4.02½	4.80
M	...	4.70	4.55	4.70	4.10	4.85
N	4.75	4.80	4.75	4.80	4.50	5.15
WG	...	5.00	5.00	5.10	4.70	5.60
WW	...	5.40	5.40	5.65	5.15	6.25
X	...	5.40	5.40	5.65	5.20	6.25
Rosins, Wood, wks (280 lb unit), wks, FF	...	4.25	...	4.25	4.05	6.35
I	...	4.70	...	4.70	4.30	7.00
M	...	5.05	5.05	5.10	4.55	7.25
N	...	5.70	5.70	5.75	5.00	7.75
Rosin, Wood. c-l, FF grade, NY	...	5.12	...	5.12	4.92	5.62
Rotten Stone, bgs mines..ton	...	35.00	...	35.00	23.50	35.00
Lump, imported, bbls ...lb.	.05	.07	.05	.07	.05	.07
Selected, bbls........lb.	.08	.10	.08	.10	.08	.10
Powdered, bbls ....lb.	.02½	.05	.02½	.05	.02½	.05
Sago Flour, 150 lb bgs ....lb.	.02¾	.03¾	.02¾	.03¾	.02¾	.03¾
Sal Soda, bbls, wks ...100 lb.	...	1.30	...	1.30	...	1.30
Salt Cake, 94-96%, c-l, wks ....ton	13.00	18.00	13.00	18.00	13.00	18.00
Chrome, c-l, wks ......ton	12.00	13.00	12.00	13.00	12.00	13.00
Saltpetre, double refd, gran, 450-500 lb bbls ......lb.	.059	.06¼	.059	.06¼	.059	.06¼
Powd, bbls ....lb.	.069	.07⅞	.069	.07⅞	.069	.07⅞
Cryst, bbls ....lb.	.069	.08	.069	.08	.069	.08
Satin, White, 550 lb bbls..lb.	...	.01½	...	.01½	...	.01½
Shellac, Bone dry, bbls..lb. r	.24	.26	.24	.26½	.19	.32
Garnet, bgs ....lb.	.17	.18	.17	.20	.17	.27
Superfine, bgs ....lb. s	.15½	.17	.15½	.18	.16	.28
T. N., bgs ....lb. s	.14	.15½	.14	.16	.13	.25
Schaeffer's Salt, kgs .....lb.	.48	.50	.48	.50	.48	.50
Silver Nitrate, vials .....oz.	...	.32⅝	...	.32⅝	.36⅜	.53¾
Slate Flour, bgs, wks ....ton	9.00	10.00	9.00	10.00	9.00	10.00
Soda Ash, 58% dense, bgs, c-l, wks ....100 lb.	...	1.25	...	1.25	...	1.25
58% light, bgs .....100 lb.	...	1.23	...	1.23	...	1.23
blk ....100 lb.	...	1.05	...	1.05	...	1.05
paper bgs ....100 lb.	...	1.20	...	1.20	...	1.20
bbls ....100 lb.	...	1.50	...	1.50	...	1.50
Soda Caustic, 76% grnd & flake, drs ....100 lb.	...	3.00	...	3.00	...	3.00
76% solid, drs .....100 lb.	...	2.60	...	2.60	...	2.60
Liquid sellers, tks, 100 lbs.	...	2.25	...	2.25	...	2.25
Sodium Abietate, drs .....lb.	...	.08	...	.08	...	.08
Acetate, tech, 450 lb bbls, wks ....lb.	.04½	.05	.04½	.05	.04½	.05
Alignate, drs ....lb.	...	.64	...	.64	...	.64
Antimoniate, bbls ......lb.	.12¾	.13¼	.12¾	.14	...	...
Arsenate, drs ....lb.	...	.10½	...	.10½	...	.10½
Arsenite, liq, drs .....gal.	.40	.75	.40	.75	.40	.75
Benzoate, USP, kgs ....lb.	.46	.48	.46	.48	.46	.48
Bicarb, 400 lb bbl, wks 100 lb.	...	1.85	...	1.85	...	1.85
Bichromate, 500 lb cks, wks ....lb.	.06½	.07	.06½	.07	.06⅛	.07
Bisulfite, 500 lb bbl, wks lb.	.03¼	.036	.03¼	.036	.03¼	.036
35-40% sol cbys, wks 100 lb.	1.95	2.10	1.95	2.10	1.95	2.10
Chlorate, bgs, wks .....lb.	.06¼	.07½	.06¼	.07½	.06¼	.07½
Chloride, tech ....ton	13.60	16.50	13.60	16.50	13.60	16.50
Cyanide, 96-98%, 100 & 250 lb drs, wks ......lb.	.15½	.17½	.15½	.17½	.15½	.17½
Fluoride, 90%, 300 lb bbls, wks ....lb.	.07¼	.08¼	.07¼	.08¼	.07¼	.08¼
Hydrosulfite, 200 lb bbls, f.o.b. wks ....lb.	.18	.19	.18	.19	.18	.21
Hyposulfite, tech, pea crys 375 lb bbls, wks 100 lb.	2.50	3.00	2.50	3.00	2.50	3.00
Tech, reg cryst, 375 lb bbls, wks ......100 lb.	2.40	2.75	2.40	2.75	2.40	2.75
Iodide ....lb.	2.00	2.05	2.00	2.05	2.00	2.40
Metanilate, 150 lb bbls..lb.	.41	.42	.41	.42	.41	.42
Metasilicate, gran, c-l, wks ....100 lb.	2.30	3.30	2.30	3.30	2.65	3.05
cryst, bbls, wks ..100 lb.	...	3.25	...	3.25	...	3.25
Monohydrate, bbls .....lb.	...	.023	...	.023	...	.02½
Napthenate, drs ....lb.	...	.09	...	.09	...	.09
Naphthionate, 300 lb bbl lb.	.52	.54	.52	.54	.52	.54
Nitrate, 92%, crude, 200 lb bgs, c-l, NY ....ton	...	25.80	24.80	25.80	...	24.80
100 lb bgs ....ton	...	26.50	25.50	26.50	...	25.50
Bulk ....ton	...	24.50	23.50	24.50	...	23.50

r Bone dry prices at Chicago 1c higher; Boston ½c; Pacific Coast 3c; Philadelphia deliveries f.o.b. N. Y.; refined 6c higher in each case; *s* T. N. and Superfine prices quoted f.o.b. N. Y. and Boston; Chicago prices 1c higher; Pacific Coast 3c; Philadelphia f.o.b. N. Y.

Current

Sodium Nitrite
Thiocarbanilid

	Current Market		1936		1935	
			Low	High	Low	High
Sodium (continued):						
Nitrite, 500 lb bbls .....lb.	.0735	.08	.0735	.08	.07¼	.08
Orthochlorotoluene, sulfonate, 175 lb bbls, wks..lb.	.25	.27	.25	.27	.25	.27
Perborate, 275 lb bbls ..lb.	.17	.18	.17	.18	.17	.19
Peroxide, bbls, 400 lb ..lb.	...	.17	...	.17	...	.17
Phosphate, di-sodium, tech, 310 lb bbls, wks 100 lb.	...	2.30	...	2.30	2.20	2.30
bgs, wks ....100 lb.	...	2.10	...	2.10	2.00	2.10
tri-sodium, tech, 325 lb bbls, wks ......100 lb.	...	2.30	...	2.30	2.30	2.70
bgs, wks ....100 lb.	...	2.10	...	2.10	2.10	2.60
Picramate, 160 lb kgs ..lb.	.67	.69	.67	.69	.67	.69
Prussiate, Yellow, 350 lb bbl, wks ....lb.	.11½	.12	.11½	.12	.11½	.12
Pyrophosphate, anhyd, 100 lb bbls ....lb.	.102	.132	.102	.132	.102	.15
Silicate, 60°, 55 gal drs, wks ....100 lb.	1.65	1.70	1.65	1.70	1.65	1.70
40°, 35 gal drs, wks 100 lb.	...	.80	...	.80	...	.80
tks, wks ....100 lb.	...	.65	...	.65	...	.65
Silicofluoride, 450 lb bbls NY ....lb.	.05¼	.05½	.05¼	.05½	.04¼	.05
Stannate, 100 lb drs ....lb.	.32½	.34	.32½	.34	.31	.38
Stearate, bbls ....lb.	.22	.26	.21	.26	.20	.25
Sulfanilate, 400 lb bbls..lb.	.16	.18	.16	.18	.16	.18
Sulfate Anhyd, 550 lb bbls c-l, wks ....100 lb. ‡	1.30	1.55	1.30	1.55	1.25	2.35
Sulfide, 80% cryst, 440 lb bbls, wks ....lb.	...	.02¼	...	.02¼	...	.02¼
62% solid, 650 lb drs, c-l, wks ....lb.	...	.03	...	.03	...	.03
Sulfite, cryst, 400 lb bbls, wks ....lb.	.023	.02½	.023	.02½	.023	.02½
Sulfocyanide, bbls ......lb.	.28	.47	.28	.47	.32	.42½
Tungstate, tech, crys, kgs lb.	.85	.90	.85	.90	...	.90
Spruce Extract, ord, tks...lb.	...	.01	...	.01	...	.01
Ordinary, bbls ....lb.	...	.01½	...	.01½	...	.01½
Super spruce ext, tks....lb.	...	.01⅝	...	.01⅝	...	.01⅝
Super spruce ext, bbls...lb.	...	.01⅞	...	.01⅞	...	.01⅞
Super spruce ext, powd, bgs ....lb.	...	.04	...	.04	...	.04
Starch, Pearl, 140 lb bgs ....100 lb.	3.09	3.29	2.99	3.29	3.13	3.78
Powd, 140 lb bgs....100 lb.	3.19	3.39	3.09	3.39	3.23	3.66
Potato, 200 lb bgs......lb.	.04½	.05½	.04½	.05½	.04½	.06
Imp, bgs ....lb.	.05¾	.06	.05¾	.06	.05¾	.06½
Rice, 200 lb bbls ....lb.	...	.07¼	...	.07¼	.07¼	.08½
Wheat, thick, bgs ......lb.	...	.08¼	...	.08¼	...	.08¼
Strontium carbonate, 600 lb bbls, wks ....lb.	.07¼	.07½	.07¼	.07½	.07¼	.07½
Nitrate, 600 lb bbls, NY lb.	.08¾	.09½	.08¾	.09½	.08¾	.09½
Sucrose octa-acetate, den, grd, bbls, wks ....lb.	.45	...	.45	...	...	...
tech, bbls, wks ....lb.	.40	...	.40	...	...	...
Sulfur	...	...	...	...	...	...
Crude, f.o.b. mines ....ton	18.00	19.00	18.00	19.00	18.00	19.00
Flour, coml, bgs ....100 lb.	1.60	2.35	1.60	2.35	1.60	2.35
bbls ....100 lb.	1.95	2.70	1.95	2.70	1.95	2.70
Rubbermakers, bgs ..100 lb.	2.20	2.80	2.20	2.80	2.20	2.80
bbls ....100 lb.	2.55	3.15	2.55	3.15	2.55	3.15
Extra fine, bgs .....100 lb.	2.40	3.00	2.40	3.00	2.40	3.00
Superfine, bgs ......100 lb.	2.20	2.80	2.20	2.80	2.20	2.80
bbls ....100 lb.	2.25	3.10	2.25	3.10	2.25	3.10
Flowers, bgs ....100 lb.	3.00	3.75	3.00	3.75	3.00	3.75
bbls ....100 lb.	3.35	4.10	3.35	4.10	3.35	4.10
Roll, bgs ....100 lb.	2.35	3.10	2.35	3.10	2.35	3.10
bbls ....100 lb.	2.50	3.25	2.50	3.25	2.50	3.25
Sulfur Chloride, red, 700 lb drs, wks ....lb.	.05	.05½	.05	.05½	.05	.05½
Yellow, 700 lb drs, wks lb.	.03½	.04½	.03½	.04½	.03½	.04½
Sulfur Dioxide, 150 lb cyl lb.	.06½	.08½	.06½	.08½	.08½	.10
Multiple units, wks ....lb.	.05½	.06	.05½	.06	...	.06½
tks, wks ....lb.	.04½	.04¾	.04½	.04¾	...	.04¾
Refrigeration, cyl, wks ...lb.	.10	.13	.10	.13	...	.13
Multiple units, wks .....lb.	.07	.09¼	.07	.09¼	...	.09¼
Sulfuryl Chloride ....lb.	.15	.40	.15	.40	.15	.40
Sumac, Italian, grd ......ton	53.00	54.00	53.00	54.00	50.00	65.00
dom, bgs, wks ....ton	...	35.00	...	35.00	...	35.00
Superphosphate, 16% bulk, wks ....ton	8.25	Nom.	8.25	Nom.	8.25	8.50
Run of pile ....ton	7.75	Nom.	7.75	Nom.	7.75	8.00
Talc, Crude, 100 lb bgs, NY ....ton	14.00	15.00	14.00	15.00	14.00	15.00
Refd, 100 lb bgs, NY ton	16.00	18.00	16.00	18.00	16.00	18.00
French, 220 lb bgs, NY ton	22.00	30.00	22.00	30.00	22.00	30.00
Refd, white, bgs .....ton	45.00	60.00	45.00	60.00	45.00	60.00
Italian, 220 lb bgs to arr ton	70.00	75.00	70.00	75.00	70.00	75.00
Refd, white, bgs, NY ton	75.00	80.00	75.00	80.00	75.00	80.00
Tankage Grd, NY ....unit ¤	...	3.10	2.85	3.10	2.35	3.00
Ungrd ....unit ¤	...	2.75	2.60	2.75	2.15	2.50
Fert grade, f.o.b. Chicago ....unit ¤	...	2.65	2.65	2.75	2.25	2.65
South American cif..unit ¤	...	3.10	3.10	3.15	2.45	3.15
Tapioca Flour, high grade, bgs ....lb.	.03½	.05½	.03½	.05½	.0215	.05
Tar Acid Oil, 15%, drs ..gal.	.22½	.23½	.22½	.23½	.21	.23½
25%, drs ....gal.	.24½	.26½	.24½	.26½	.23	.26½
Tar, pine, delv, drs .....gal.	.25	.26	.25	.26	.25	.26
tks, delv ....gal.	...	.20	...	.20	...	.20
Tartar Emetic, tech ......lb.	.24¾	.25	.24¾	.25	.22¾	.25
USP, bbls ....lb.	.28	.28½	.28	.28½	.28	.28½
Terpineol, den grd, drs ...lb.	.13¾	.14¾	.13¾	.14¾	.13¾	.14¾
tks ....lb.	.13	.14	.13	.14	.13	.14
Tetrachlorethane, 50 gal drs lb.	.08	.08½	.08	.08½	.08½	.09
Tetralene, 50 gal drs, wks lb.	.12	.13	.12	.13	.12	.13
Thiocarbanilid, 170 lb bbl..lb.	.20	.25	.20	.25	.20	.25

‡ Bags 15c lower; ¤ + 10.

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Prices

	Current Market		1936 Low	1936 High	1935 Low	1935 High
Tin, crystals, 500 lb bbls, wks ....lb.	.36½	.37	.36½	.37½	.36	.39½
Metal, NY ....lb.	.48⅞	...	.48¼	.48⅞	.456	.52½
Oxide, 300 lb bbls, wks lb.	.51	.53	.51	.53	.51	.58
Tetrachloride, 100 lb drs, wks ....lb.	...	.24¾	...	.24¾	.24¾	.26¾
Titanium Dioxide, 300 lb bbls ....lb.	.17¼	.19¼	.17¼	.19¼	.17¼	.19¼
Barium Pigment, bbls ..lb.	.06¼	.06½	.06¼	.06½	.06¼	.06½
Calcium Pigment, bbls ..lb.	.06¼	.06½	.06¼	.06½	.06¼	.06½
Toluol, 110 gal drs, wks gal.	...	.35	...	.35	...	.35
8000 gal tks, frt allowed gal.	...	.30	...	.30	...	.30
Toluidine, mixed, 900 lb drs, wks ....lb.	.27	.28	.27	.28	.27	.28
Toner Lithol, red, bbls ....lb.	.75	.80	.75	.80	.75	.80
Para, red, bbls ....lb.	...	.75	...	.75	...	.75
Toluidine, bgs ....lb.	...	1.35	...	1.35	...	1.35
Triacetin, 50 gal drs, wks lb.	.32	.36	.32	.36	.32	.36
Triamylamine, drs, wks ..lb.	...	1.25	...	1.25	...	1.25
Trichlorethylene, 50 gal drs lb.	.089	.094	.089	.094	.09½	.10
Triethanolamine, 50 gal drs wks ....lb.	.26	.30	.26	.30	.26	.38
tks, wks ....lb.	...	.25	...	.25	...	...
Tricresyl Phosphate, drs ..lb.	.19	.26	.19	.26	.21	.23
Triphenyl Guanidine ....lb.	.58	.60	.58	.60	.58	.60
Tripoli, airfloated, bgs, wks ....ton	27.50	30.00	27.50	30.00	27.50	30.00
Tungsten, Wolframite per unit	15.00	15.25	15.00	15.25	15.00	15.25
Turpentine (Spirits), c-l, NY dock, bbls ....gal.	...	.50	.49½	.50	.43¾	.55½
Savannah, bbls ....gal.	...	.45	.44½	.45	.38¾	.50¼
Jacksonville, bbls ....gal.	...	.44½	.44¼	.44½	.38¾	.50¼
Wood Steam dist, bbls, c-l, NY ....gal.	...	.47	...	.47	.43	.50
Urea, pure, 112 lb cases ..lb.	.15½	.17	.15½	.17	.15½	.17
Fert grade, bgs, c.i.f. ..ton c.i.f. S.A. points ....ton	95.00	110.00	95.00	110.00	100.00	120.00
Urea, dom, f.o.b., wks....ton	95.00	110.00	95.00	110.00	...	...
Urea Ammonia liq 55% NH_3, tks ....unit	...	.96	...	.96	...	.96
Valonia beard, 42%, tannin bgs ....ton	60.00	Nom.	60.00	Nom.	40.00	58.00
Cups, 32% tannin, bgs..ton	...	Nom.	...	Nom.	26.00	49.00
Mixture, bark, bgs ....ton	...	Nom.	...	Nom.	...	32.00
Vanilin, ex eugenol, 100 lb tins ....lb.	...	3.75	...	3.75	...	...
Ex-guaiacol ....lb.	...	3.65	...	3.65	...	...
Vermillion, English, kgs ..lb.	1.59	1.61	1.58	1.79	1.48	1.71
Vinyl Chloride, 16 lb cyl ..lb.	...	1.00	..	1.00	...	1.00
Wattle Bark, bgs ....ton	27.50	29.75	27.50	29.75	29.00	32.00
Extract, 60°, tks, bbls ..lb.	...	.03⅝	...	.03⅝	...	.03¾

WAXES

	Current Market		1936 Low	1936 High	1935 Low	1935 High
Wax, Bayberry, bgs ....lb.	.17½	.20	.17½	.20	.17½	.23
Bees, bleached, white 500 lb slabs, cases ....lb.	.34	.35	.34	.35	.33½	.34
Yellow, African, bgs..lb.	.25	.26½	.24	.26½	.21	.25½
Brazilian, bgs ....lb.	.26	.28	.25	.28	.21½	.26½
Chilean, bgs ....lb.	.26	.28	.25	.28	.21½	.26½
Refined, 500 lb slabs, cases ....lb.	.28	.30	.28	.30	.27½	.28
Candelilla, bgs ....lb.	.16	.17½	.16	.17½	.10	.17½
Carnauba, No. 1, yellow, bgs ....lb.	.45	.46½	.45	.48	.35	.54
No. 2, yellow, bgs ....lb.	.44	.45	.44	.46	.34	.51
No. 2, N. C., bgs ....lb.	.40½	.41	.40	.41	.26½	.43½
No. 3, Chalky, bgs ...lb.	.35	.37	.35	.38	.21	.42½
No. 3, N. C., bgs ....lb.	.35	.37	.35	.41	.22½	.43
Ceresin, white, imp, bgs lb.	.43	.45	.43	.45	.43	.45
Yellow, bgs ....lb.	.36	.38	.36	.38	.36	.38
Domestic, bgs ....lb.	.08	.11	.08	.11	.08	.11
Japan, 224 lb cases ....lb.	.08	.08½	.08	.08¾	.06	.09
Montan, crude, bgs ....lb.	.10¾	.11¾	.10¾	.11¾	.10½	.11¾
Paraffin, see Paraffin Wax.						
Spermaceti, blocks, cases lb.	.22	.24	.22	.24	.19	.24
Cakes, cases ....lb.	.23	.25	.23	.25	.20	.25
Whiting, prec 200 lb bgs, c-l, wks ....ton	...	15.00	...	15.00	12.00	15.00
Alba, bgs, c-l, wks ....ton	...	15.00	...	15.00	...	15.00
Gliders, bgs, c-l, wks ..ton	...	15.00	...	15.00	...	15.00
Wood Flour, c-l, bgs ....ton	18.00	30.00	18.00	30.00	18.00	30.00
Xylol, frt allowed, East 10° tks, wks ....gal.	...	.33	...	.33	.27	.33
Coml, tks, wks, frt allowed ....gal.	...	.30	...	.30	.26	.30
Xylidine, mixed crude, drs lb.	.36	.37	.36	.37	.36	.37
Zinc, Carbonate tech, bbls, NY ....lb.	.09½	.11	.09½	.11	.09½	.11
Chloride fused, 600 lb drs, wks ....lb.	.04½	.05¾	.04½	.05¾	.04½	.05¾
Gran, 500 lb bbls, wks ..lb.	.05	.05¾	.05	.05¾	.05	.05¾
Soln 50%, tks, wks..100 lb.	...	2.00	...	2.00	...	2.00
Cyanade, 100 lb drs ....lb.	.36	.38	.36	.38	.36	.41
Zinc Dust, 500 lb bbls, c-l, delv ....lb.	...	.069	.0685	.069	.057	.0685
Metal, high grade slabs, c-l, NY ....100 lb.	...	5.27	5.22	5.27	4.05	5.22½
E. St. Louis ....100 lb.	...	4.90	4.85	4.90	3.70	4.85
Oxide, Amer, bgs, wks..lb.	.05	.05½	.05	.05½	.05	.06¼
French, 300 lb bbls, wks ....lb.	.05½	.07	.05½	.07	.05½	.10⅞
Palmitate, bbls ....lb.	.22	.23	.22	.23	.21	.23
Perborate, 100 lb drs ...lb.	...	1.25	...	1.25	...	1.25
Peroxide, 100 lb drs ...lb.	...	1.25	...	1.25	...	1.25
Resinate, fused, dark, bbls ....lb.	.05¾	.06½	.05¾	.06½	.05¾	.06½
Stearate, 50 lb bbls ....lb.	.19	.22	.19	.22	.18	.22

	Current Market		1936 Low	1936 High	1935 Low	1935 High
Zinc Sulfate, crys, 400 lb bbl, wks ....lb.	.028	.033	.028	.033	.028	.033
Flake, bbls ....lb.	.032	.035	.032	.035	.032	.035
Sulfide, 500 lb bbls, delv lb.	.10¾	.11¾	.10¾	.11¾	.10¾	.11¾
bgs, delv ....lb.	.10½	.11½	.10½	.11½	.10½	.11½
Sulfocarbolate, 100 lb kgs ....lb.	.24	.25	.24	.25	.24	.25
Zirconium Oxide, Nat kgs lb.	.02½	.03	.02½	.03	.02½	.03
Pure, kgs ....lb.	.45	.50	.45	.50	.45	.50
Semi-refined, kgs ....lb.	.08	.10	.08	.10	.08	.10

Oils and Fats

	Current Market		1936 Low	1936 High	1935 Low	1935 High
Castor, No. 3, 400 lb bbls..lb.	.10¼	.10¾	.10¼	.10¾	.09¾	.10¾
Blown, 400 lb bbls ....lb.	.12¼	.13	.12¼	.13	.11½	.16
China Wood, bbls spot NY lb.	.16½	.16¾	.14	.16¾	.094	.40
Tks, spot NY ....lb.	.13¾	.13⅞	.13¾	.13⅞	.088	.35
Coast, tks ....lb.	.162	.165	.132	.165	.087	.24
Coconut, edible, bbls NY..lb.	...	.10¼	...	.10¼	.04	.12
Manila, tks, NY ....lb.	...	.04⅝	.04⅝	.05	.03¾	.06¼
Tks, Pacific Coast ....lb.	...	.04⅜	.04⅜	.04⅞	.03⅜	.06
Cod, Newfoundland, 50 gal bbls ....gal.	...	.40	...	.40	.34	.38
Copra, bgs, NY ....lb.	.0285	.0290	.0285	.0290	.02	.038
Corn, crude, tks, mills ....lb.	.08¾	.08⅞	.08¾	.09½	.08¾	.11
Refd, 375 lb bbls, NY ..lb.	.11½	.11¾	.11½	.12¾	.11½	.14
Cottonseed, see Oils and Fats News Section.						
Degras, American, 50 gal bbls, NY ....lb.	.05¼	.06¾	.05¼	.06¾	.04½	.06
English, brown, bbls, NY lb.	.08¾	.10¼	.08¾	.10¼	.04¾	.06½
Greases, Yellow ....lb.	.05¼	.05½	.05¼	.05½	.05	.06¾
White, choice bbls, NY lb,	.05¾	.07¾	.05¾	.07¾	.05¼	.08½
Herring, Coast, tks ....gal.	...	Nom.	...	Nom.	.23	.33
Lard Oil, edible, prime ...lb.	...	.14½	...	.14½	.09¾	.20½
Extra, bbls ....lb.	...	.11	...	.11	.08½	.11¾
Extra, No. 1, bbls ....lb.	...	.09	...	.09	.08¼	.11
Linseed, Raw, less than 5 bbl lots ....lb.	.104	.108	.104	.108	.091	.1130
bbls, c-l, spot ....lb.	...	.10	...	.10	.083	.102
Tks ....lb.	...	.094	...	.094	.0770	.096
Menhaden, tks, Baltimore gal.	...	.36	...	.36	.25	.36
Refined, alkali, drs ....lb.	.075	.079	.075	.082	.061	.082
Tks ....lb.	...	.069	.069	.072	.055	.072
Light pressed, drs ....lb.	.069	.073	.069	.076	.055	.076
Tks ....lb.	...	.063	.063	.066	.049	.066
Kettle bodied, drs ....lb.	...	.093	.093	.096	...	...
Neatsfoot, CT, 20° bbls, NY ....lb.	...	.16¾	...	.16¾	.16¼	.16¾
Extra, bbls, NY ....lb.	...	.09¼	...	.09¼	.08½	.11¼
Pure, bbls, NY ....lb.	...	.12¾	...	.12¾	.11¾	.13¼
Oleo, No. 1, bbls, NY ....lb.	...	.12	.12	.12½	.10¾	.14½
No. 2, bbls, NY ....lb.	...	.11½	.11½	.12	.10	.13¾
Olive, denat, bbls, NY ...gal.	.75	.76	.75	.80	.82	.95
Edible, bbls, NY ....gal.	1.60	1.90	1.60	1.90	1.55	1.90
Foots, bbls, NY ....lb.	.08¼	.08⅜	.08¼	.08¾	.07⅛	.10
Oticica, bbls ....lb.	.13	.13½	.11	.13½	.13½	.28
Palm, Kernel, bulk ....lb.	...	.04¾	...	.04¾	...	...
Niger, cks ....lb.	.04⅞	.05	.04⅞	.05	.034	.05¾
Sumatra, tks ....lb.	...	.04½	.04½	.046	...	...
Peanut, crude, bbls, NY ..lb.	...	.09	.09	.09¼	...	...
Tks, f.o.b. mill ....lb.	...	.08¾	.08¾	.09⅛	.08¾	.10¾
Refined, bbls, NY ....lb.	.12¼	.13¼	.12¼	.13¼	.12½	.14
Perilla, drs, NY ....lb.	.07	.07¼	.07	.07½	.07¼	.10¼
Tks, Coast ....lb.	...	.066	.066	.068	.068	.08½
Pine, see Pine Oil, Chemical Section.						
Rapeseed, blown, bbls, NY lb.	.086	.088	.086	.088	.07½	.09
Denatured, drs, NY ...gal.	.52	.53	.52	.56	.40	.56
Red, Distilled, bbls ....lb.	.09⅝	.10⅝	.09⅝	.10⅝	.07⅜	.10⅝
Tks ....lb.	...	.08¾	...	.08¾	.06½	.08¾
Salmon, Coast, 8000 gal tks ....gal.	...	.31	...	.31	.25	.35
Sardine, Pac Coast, tks ..gal.	.34	.36	.34	.39	.24½	.37½
Refined alkali, drs ....lb.	.075	.079	.075	.082	.065	.082
Tks ....lb.	...	.069	.069	.072	.06	.072
Light pressed, drs ....lb.	.069	.073	.069	.076	.055	.076
Tks ....lb.	...	.063	.063	.066	.049	.066
Sesame, yellow, dom ....lb.	.13	.13½	.13	.14½	.12¼	.15½
White, dos ....lb.	.13	.13½	.13	.14½	.12¾	.15½
Soy Bean, crude						
Dom, tks, f.o.b. mills ...lb.	...	.08	.08	.085	.08	.10
Crude, drs, NY ....lb.	.086	.09	.086	.095	.086	.11
Refd, bbls, NY ....lb.	.091	.10	.091	.105	.091	.115
Tks ....lb.	.085	.09	.085	.095	.08	.10½
Sperm, 38° CT, bleached, bbls NY ....lb.	.094	.096	.094	.101	.099	.101
45° CT, bleached, bbls, NY ....lb.	.087	.089	.087	.094	.092	.094
Stearic Acid, double pressed dist bgs ....lb.	.10	.11	.10	.11	.10	.12¼
Double pressed saponified bgs ....lb.	.10½	.11½	.10½	.11½	.09	.12¾
Triple pressed dist bgs..lb.	.12¾	.13¾	.12¾	.13¾	.12¾	.15¼
Stearine, Oleo, bbls ....lb.	.08¼	.08½	.08¼	.09	.09¼	.12½
Tallow City, extra loose ..lb.	...	.06	.06	.06⅝	.05⅜	.07⅜
Edible, tierces ....lb.	...	.07⅝	.07⅝	.08½	.07¼	.09¼
Acidless, tks, NY ....lb.	...	.08¾	...	.08¾	.07½	.10¾
Turkey Red, single, bbls ..lb.	.08	.08½	.08	.08½	.07½	.08½
Double, bbls ....lb.	.13	.13½	.13	.13½	.12½	.13½
Whale:						
Winter bleach, bbls, NY lb.	.079	.081	.079	.081	.07	.083
Refined, nat, bbls, NY ..lb.	....	.075	...	.075	.064	.081

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"We"—Editorially Speaking

February (even with an extra day) is a short month, but it certainly furnished some long laughs—to wit:

Franklin D. Roosevelt, publicly endorsing the stand of the League of Women Voters to protect and extend the principle of civil service for all Government employees, is the perfect example of grim humor, and for the height of ridiculous humor, Senator Borah saying that he stands squarely behind Thomas Jefferson and Alexander Hamilton. The first is like an executioner praising the long white neck of his victim: the second is as logical as standing beside Il Duce and the Lion of Judah.

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Bobby Burns' prayer to see ourselves as others see us was neatly answered by James Wallen, who conducts a "colyum" in the *Martinsburg* (W. Va.) *Journal*, when he wrote:

West Virginia is acquiring a sizable stake in the chemical field. The chemical evolution is one of the surest evidences that "Time marches on."

So it is that I religiously read the de luxe publication, CHEMICAL INDUSTRIES, with fascinated attention.

As a matter of state interest I find that a gigantic plant at Charleston utilizes the gases from nearby oil refineries.

Williams Haynes relates a conversation with an eminent chemical engineer from New Zealand. He is W. Cassels-Brown who affirms that we are economically "heels over head," which I take to mean upside down.

After I struggled sturdily through a toughly-technical article on zinc by Bruce R. Silver, I came on some items well within my powers of comprehension.

Quoting exactly: "Miss Alice F. du Pont, daughter of Mr. and Mrs. A. Felix du Pont to James Paul Mills on November 29th."

There is another item about Pierre du Pont's annual party for the old folks of Wilmington.

The personal which most allured me is this: "David Tumpeer, of Wishnick-Tumpeer, is in Florida recuperating from a bad cold."

And I have spent many times the fare to Florida for chemicals warranted to cure colds, no better or worse than Tumpeer's. This last bit is quite a shock. One's chemical confidence oozes away while he reads.

As George M. Cohan used to recite to the muted notes of Hearts and Flowers, "Life's a funny proposition after all."

It does prove that CHEMICAL INDUSTRIES realizes that business is made up of people. Now, if that sentiment carries right down through the plant to the last puddler, I am with the editors.

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Think back only a few years ago to the days when the best chemical advertisement was only a glorified calling card and look at the advertisements in this issue. There has been a tremendous improvement in chemical publicity in the past fifteen years, and one of the men who has been a potent factor in this progress writes an article in this issue, voicing his belief that what has been done in this direction will be far outdone in the next few years. Carl Hazard's "Chemicals Are Bought—Not Sold" is good advice on aiding chemical sales by the man who has earned his right to give good, seasoned counsel.

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As an example to patriots—Fred Lancaster will pay the fare of four stalwart sons back to their home voting district in Pittsburgh on the third day of next November.

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Fifteen Years Ago

From our issues of March, 1921

F. M. (Borax) Smith acquires title to newly discovered borax deposits in Clark County, Nevada.

Du Pont considers erection large dry color plant; another unit for the lithopone plant, and a new paint and varnish plant.

Jacob Hasslacher passes in 69th year.

William B. Leach, Jr., engaged by Mathieson Alkali as assistant manager of their Niagara Falls works.

Boyer-Kienle Co., N. Y., organized to conduct a brokerage business.

C. R. de Long made director, chemical section, Tariff Commission.

Roco Chemical Co., Lawrenceburg, Ind., changes name to Rossville Chemical Co.

Chemists' Club plans tenth birthday celebration.

Doe & Ingalls incorporate at Boston, capital $100,000.

By-Products Coke denies plan to merge with Allied Chemical.

Wm. S. Gray & Co. lease large suite of offices in Canadian Pacific Bldg., 43rd St. and Madison Ave., N. Y. C.

J. F. T. ("Blink") Berliner, author of the article on Urea, this issue, is an old hand at developing uses for chemicals, having been engaged in that capacity since 1929 for du Pont's Ammonia Department. Dr. Berliner earned his doctorate in chemistry from George Washington University in 1926. From 1918 until entering du Pont, he has been employed by various government bureaus as metallurgist and chemist. He is an expert in potash resources, motor fuels, and, as our readers will note, urea. He is 33 years old, and among other hobbies collects minerals.

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Apparently "from log cabin to White House" is not an exclusive Americanism. The new president of the Imperial Chemical Industries, H. J. MacMitchell, successor to the late Marquis of Reading, started as an office boy in the London offices in 1893.

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Returnable containers are a recurring problem with which we are all perfectly familiar but figures do visualize the importance and magnitude of this: the recently published balance sheet of Mathieson contains this item: Containers charged to customers, 1935—$178,952.80; 1934, $174,564.40.

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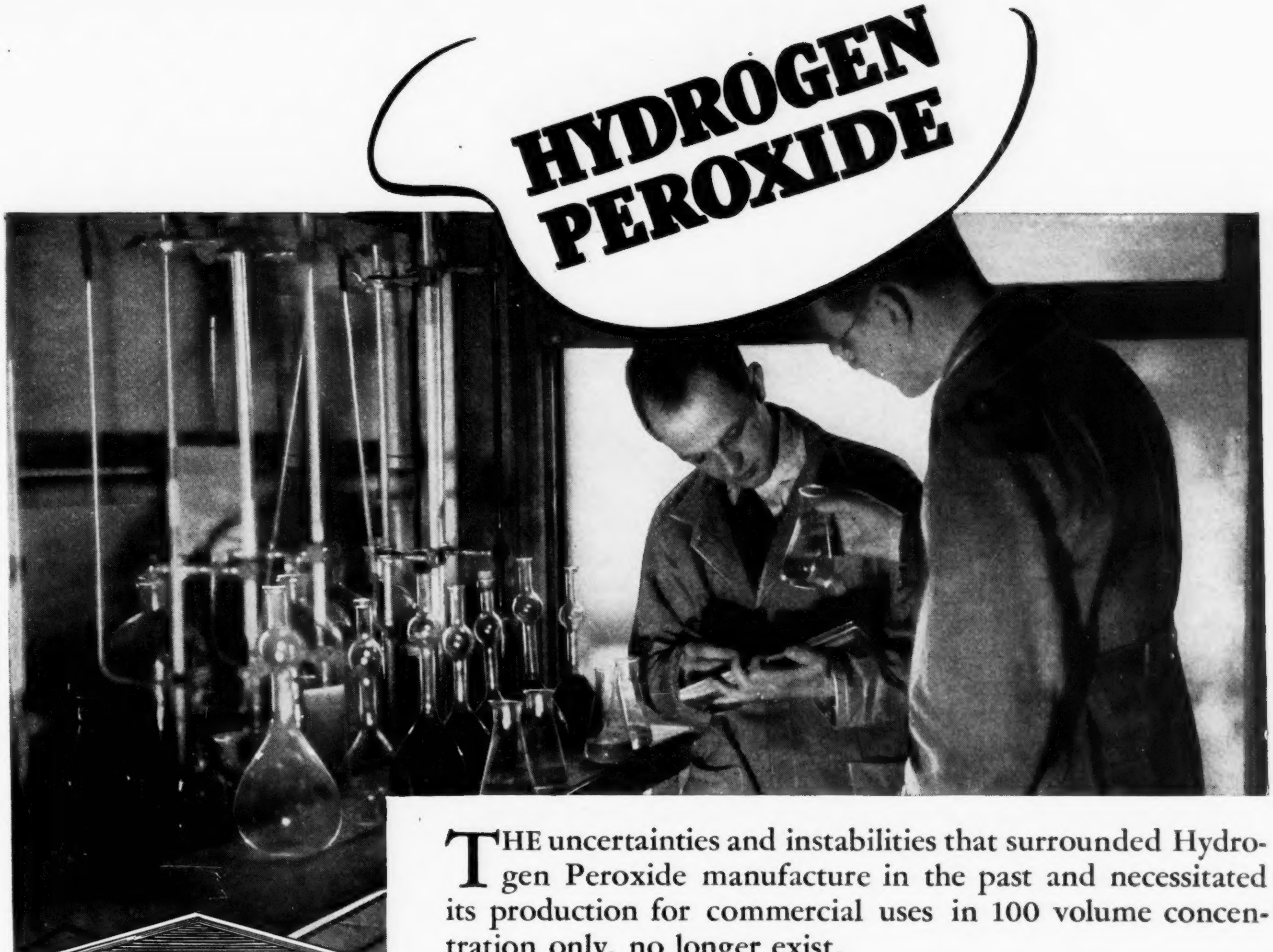
Donald E. Sharp, collaborator with Aaron K. Lyle on the article on feldspar in this issue, was born in Corning, N. Y. After public school, he attended the University of Wisconsin and Carnegie Institute of Technology, majoring in physics. His commercial career started in the physics laboratory of Corning Glass; several years with Spencer Lens Company; and since 1929, president of Bailey & Sharp, consulting glass technologists. He is a member of several American and foreign technical societies Mr. Lyle was born in Washington, Pa., and is a graduate of Washington & Jefferson College. He was a star in basketball and is a former member of a famous college championship team. For about three years he was instructor of chemistry at Washington and Jefferson, then with Hazel-Atlas as research chemist for about five years, and for the last few years has been chief chemist at Bailey & Sharp Co. Both Mr. Lyle and Mr. Sharp have contributed generously to the literature on the subject of glass, and both have been active in the Glass Division of the American Ceramic Society.



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